

**TRIANGLE PARK LLC – NORTH PORTLAND YARD
CSM Site Summary – Appendix A-18**

TRIANGLE PARK LLC – NORTH PORTLAND YARD

Oregon DEQ ECSI #: 277

5828 N. Van Houten Pl.

DEQ Site Mgr: Jim Anderson

Latitude: 45.5742°

Longitude: -122.7354°

Township/Range/Section: 1N/1E/18

River Mile: 7.4 East bank

LWG Member ☐ Yes ☒ No

Upland Analytical Data Status: ☐ Electronic Data Available ☒ Hardcopies only

1. SUMMARY OF POTENTIAL CONTAMINANT TRANSPORT PATHWAYS TO THE RIVER

The current understanding of the transport mechanism of contaminants from the uplands portions of the Triangle Park LLC site to the river is summarized in this section and Table 1, and supported in following sections.

1.1. Overland Transport

Overland sheet runoff may transport surface soils eroded from the upland portion of the site and is a potential transport pathway to the river (MFA 2001b). MFA (2003a) concluded that the potential for some PAHs and PCBs in soil to migrate to river sediment could not be eliminated.

1.2. Riverbank Erosion

Erosion and transport of bank soils is a potentially complete transport pathway to the river (MFA 2001b).

1.3. Groundwater

A relatively high percentage of groundwater samples collected over a broad area at the site had detections of petroleum-related constituents, including PAHs. Phthalates, halogenated volatile organic compounds (HVOCs), polychlorinated biphenyls (PCBs), and metals also have been detected in some of the groundwater samples. Additional data are required to assess the magnitude and extent of impacted groundwater. Limited information is available regarding the groundwater flow direction, gradient, and preferential pathways at the site. The DEQ suspects that the groundwater pathway from the uplands to the Willamette River may be complete and that impacted groundwater may discharge to the river in the vicinity of the former docks (DEQ 2004c). In addition, surface water drainage pipes cross the property. However, no information has been presented regarding the depths of the utilities at the facility relative to the shallow groundwater table or if the utility and associated backfill may be a preferential pathway at the site.

1.4. Direct Discharge (Overwater Activities and Stormwater/Wastewater Systems)

Sources to the two private outfalls on the site are unknown, although MFA (2001b) reports that surface water from the site may discharge through these outfalls. Surface water runoff is a potential pathway to the river for transport of contaminated surface soils. MFA (2003a)

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concluded that the potential for some PAHs and PCBs in soil to migrate to river sediment could not be ruled out, and concentrations of these chemicals in soil samples collected near the river and stormwater catch basins exceeded DEQ sediment screening level values¹.

There were historical overwater activities, but no release information is available.

1.5. Relationship of Upland Sources to River Sediments

See Final CSM Update.

1.6. Sediment Transport

The Triangle Park site is located on an off-channel cove in the downstream portion of a large area in the lower Willamette characterized as depositional in the Portland Harbor Work Plan based on the sediment-profile and time-series bathymetry surveys (Integral et al. 2004). The Sediment Trend Analysis[®] results suggest that the nearshore area along the upstream end and extending into the Triangle Park cove is a region of dynamic equilibrium. Downstream of this area, the transport paths transition to net accretion. Time-series bathymetric change data over the 25-month period from January 2002 through February 2004 show that most of the Triangle Park cove has experienced no measurable riverbed elevation change (Integral and DEA 2004). Exceptions to this include an oval-shaped area of sediment scour (up to 1 foot in extent) at the upstream, riverside corner of the cove, which may reflect the influence of in-water structures and/or vessel traffic. Just downstream of this scoured area, there is an area of sediment accretion (up to 1 foot in extent) centered along the outer margin of the cove between -15 and 25 foot NAVD88 contours. In the eastern portion of the main stem of the river offshore of the Triangle Park cove, areas of no change are interspersed with areas of net sediment accretion ranging from 0.5 to 1 foot in extent. Water depth or obstructions prevented the survey vessel from accessing the inner portions of cove above the - 5 foot NAVD88 contour, therefore no information is available on erosion or depositional patterns in these nearshore areas immediately off of the site.

2. CSM SITE SUMMARY REVISIONS

Date of Last Revision: October 10, 2005 (based primarily on information obtained prior to September 15, 2004)

3. PROJECT STATUS

Project status information was obtained from MFA (2003b) and DEQ (2004a). Under the terms of the prospective purchaser agreement between Triangle and DEQ, effective May 23, 1997, Triangle is required to perform an RI/FS for onsite surface and subsurface soils above the ordinary high water line only. They may also be required to perform any remedial action for soil. In March 2001, DEQ referred groundwater and sediment issues at the site to the DEQ Orphan Site Program (DEQ 2004a).

Activity	Date(s)/Comments
PA/XPA	<input checked="" type="checkbox"/> Completed 1995 [by Geraghty & Miller; <i>not seen, as cited by MFA (2002)</i>]
RI	<input checked="" type="checkbox"/> Completed 2002 (soil only) (MFA 2002), HHRA and Level II Screening ERA completed December 2002 and February 2004, respectively.

¹ Sediment screening level values reported by DEQ (2002).

Activity	Date(s)/Comments
FS	<input checked="" type="checkbox"/> FS work plan (soil only) completed 2003 (MFA 2003b)
Interim Action/Source Control	<input type="checkbox"/>
ROD	<input checked="" type="checkbox"/> Nearly done for soil remedy; groundwater and sediment contamination are orphan issues.
RD/RA	<input type="checkbox"/>
NFA	<input type="checkbox"/>

DEQ Portland Harbor Site Ranking (Tier 1, 2, or 3): Tier 1

4. SITE OWNER HISTORY

The following is a list of some of the past owners of parcels currently owned by Triangle Park. The list was compiled from GeoEngineers (1992). All dates are approximate.

Owner/Occupant	Type of Operation	Years
Triangle Park	Vacant	1997 – present
Riedel Environmental Technologies/Riedel International/Willamette-Western Corp.	Construction, equipment, environmental cleanup	1980 – 1997
Sakrete Inc.	Pre-packaged concrete	1970 - 1985
Evergreen Chemical and Soap Co.	Unknown	1952 - 1960
Harris Bros. Lumber Co.	Lumber mill	1950 - 1956
North Pacific Lumber Co.	Lumber manufacturer	1950?
Wilson River Lumber Co./Logging Co.	Lumber mill	1949 - 1957
Willamette Tug and Barge Co.	Marine towing	1949 - 1970
Willamette Hi-Grade Concrete	Concrete	1949 - 1970
Western Cooperaage	Warehouse, mill	1935 - 1960
Dry Dock of Portland	Possibly shipbuilding or repair	~1935
Port of Portland Dry Dock	Possibly shipbuilding or repair	~1930
Peninsula Dock & Lumber Co./Peninsula Forest Products Co.	Lumber manufacturer, sawmill	1905 - 1949
Peninsula Ship Building Co.	Shipbuilding	1921 - 1946
Portland Railway Light & Power	Unknown	1905 - 1925
Standard Oil	Wharf	1905 – 1915

5. PROPERTY DESCRIPTION

Information on the property was obtained from MFA (2002, 2003a,b). The approximately 35-acre site is located between the Willamette River and a high (115 – 130 foot) bluff (occupied by the University of Portland and residences) (Figure 1). The Triangle Park site topography is generally flat, sloping gently to the west-southwest. Elevations range from about 23 – 40 feet. There are both paved and unpaved gravel areas on the property. Runoff is generally from east to west, but it may be influenced locally by flow to catch basins. The site shoreline is mostly steeply sloped banks with

manmade structures such as docks and dolphins extending out into the river. It is currently zoned for industrial use.

The Union Pacific Railroad line and right-of-way bisects the site from northwest to southeast. An abandoned fuel pipeline is located under the UPRR property (MFA 2001a, 2002). A pump station for an underground jet fuel pipeline owned by Chevron is located on the site near its southernmost corner; this pipeline passes under the site's south and southeast boundaries (GeoEngineers 1992; MFA 2001a, 2002).

The site is currently unoccupied. The northern third contains a grassy field bordered with bushes and trees. The southern two-thirds of the property are covered mainly by broken pavement, gravel, bare dirt, and some patches of weeds. Eight structures remain on the site, including warehouse buildings and the former powerhouse.

Triangle Park, LLC, leases a portion of the riverbed adjacent to its upland property from DSL (see Exhibit "A" in supplemental figures).

6. CURRENT SITE USE

The site is currently vacant. There is temporary barge moorage along the shoreline. A pump station for an underground jet fuel pipeline owned by Chevron is located on the site near its southernmost corner; this pipeline passes under the site's south and southeast boundaries.

Triangle Park LLC plans to redevelop a portion of the site for the Zidell barge building operations and the remainder for a mix of industrial and commercial uses (DEQ 2003).

7. SITE USE HISTORY

The site has been in active use since before 1900 (DEQ 2003). MFA (2003b) and DEQ (2004a) report that past activities at the site have included milling lumber, marine services (i.e., shipbuilding, dry-dock operations), electrical-power generation (possibly fueled with wood wastes, coal, bunker fuel, diesel fuel), manufacturing and storage, and transformer cleaning and storage. A fuel pipeline was located on the property but is now abandoned; the pipeline owned by Chevron is still active. Specific details regarding all the past uses and practices are unknown, but paints, petroleum products, solvents, degreasers, coal tar, lime and other chemicals may have been used (GeoEngineers 1992). Historical building locations are shown in Supplemental Figure 4 from MFA (2003b). Most buildings were demolished in the late 1990s – 2000. The vacated site was used as a movie set in the early 2000s.

GeoEngineers (1992) reports that the most recent active site operator, Riedel International, was primarily involved in construction and heavy equipment. Riedel Environmental also occupied the site and responded to chemical, industrial and accidental spills of contaminants on the ground or in waterways. All equipment was stored and cleaned on-site. Between 1980 and 1984, the site included a regulated hazardous waste storage area. The site became inactive in 1984.

8. CURRENT AND HISTORIC SOURCES AND COPCS

The understanding of the historic and current potential upland and overwater sources at the site is summarized in Table 1. The following sections provide a brief discussion of the potential sources and COPCs at the site requiring additional discussion.

8.1. Uplands

Upland source areas identified in the RI are shown in Supplemental Figure 4 from MFA (2003b). Areas were initially defined based on historical use (GeoEngineers 1992), and these areas are indicated with letters in Supplemental Figure 4 from MFA (2003b). The areas were then grouped based on future anticipated land use and exposure, and these risk areas are indicated with numbers in Supplemental Figure 4 from MFA (2003b). The potential source areas and COIs identified in the RI are listed in Table 1.

8.2. Overwater Activities

☒ Yes ☐ No

Historic overwater activities included product transfer and shipbuilding and repair; however, these operations predate spill reporting requirements and there are no reports of releases to the river due to overwater activities. During a site visit in January 1992, GeoEngineers (1992) observed an oily sheen on the water surrounding a boom at the base of a loading ramp to the dock.

There was no record of any wharf or structure registration with Oregon DSL.

8.3. Spills

Known or documented spills at Triangle Park were obtained either from DEQ's Emergency Response Information System (ERIS) database for the period of 1995 to 2004, from oil and chemical spills recorded from 1982 to 2003 by the U.S. Coast Guard and the National Response Center's centralized federal database [see Appendix E of the Portland Harbor Work Plan (Integral et al. 2004)], from facility-specific technical reports, or from DEQ correspondence. These spills are summarized below.

Date	Material(s) Released	Volume Spilled (gallons)	Spill Surface (gravel, asphalt, sewer)	Action Taken (yes /no)
6/15/04	Diesel	~100 gal	gravel	Cleanup; did not reach waterway

This recent spill occurred when a vehicle crossing a railroad track punctured one of the vehicle's fuel tanks.

In 1992, GeoEngineers (1992) observed surface staining in several areas of the property and an oily sheen in the water, but did not provide any specific spill information.

9. PHYSICAL SITE SETTING

The primary sources for geologic and hydrogeologic information for the site are from the RI report for soil (MFA 2002) and information from the deep boring (WGB-6) completed by URS as part of the City of Portland combined sewer overflow project. The deep boring is located in the southern portion of the site.

9.1. Geology

At least 26 test pits, 175 direct push borings, and 7 monitoring wells have been completed at the site. Most test pits and borings were completed within the first 20 feet of the subsurface. However, boring WGB-6 was completed to a depth of 258 feet bgs. The site stratigraphy is reported as fill underlain by alluvial deposits. Pleistocene flood deposits underlie the alluvial deposits. The Sandy River Mudstone Formation underlies the Pleistocene flood deposits. Sand and gravel of the upper Troutdale Formation may be present between the Pleistocene flood deposits and the Sandy River Mudstone in places, but it was not differentiated from the

coarse-grained facies of the flood deposits in the boring log.

The fill blanketing the site extends to a depth of approximately 15 feet bgs and is composed predominantly of sand. The recent alluvium consists of interbedded sand, silty sand, and silt with some layers of gravel and generally extends beyond the depth of the boreholes. In one borehole, the base of the Quaternary deposits was interpreted at 105 feet bgs. From 105 feet to 220 feet bgs, coarse-grained Pleistocene flood deposits are present based on the log. Below the Pleistocene flood deposits, the Sandy River Mudstone was encountered at the total depth explored (258 feet bgs).

Generalized geologic cross-sections of the site have been prepared on the basis of subsurface data collected from the borings (MFA 2002). Supplemental Figure 4-1 from MFA (2002) is a cross section location map. Supplemental Figures 4-2 through 4-5 from MFA (2002) are geologic cross sections at various orientations through the site.

9.2. Hydrogeology

The uppermost water-bearing zone occurs in the fill and recent alluvial deposits. Water level data collected from monitoring wells penetrating the upper zone indicate the depth to water ranges from 9 to 25 feet bgs. The water level data indicate that groundwater flow direction is generally southwesterly, toward the Willamette River; however, detailed and precise groundwater level data are not available. At the adjacent McCormick and Baxter site, located northwest of the Triangle Park site, water level fluctuations of up to 4 feet were observed during tidal cycles. A silt layer was observed from 70 to 102 feet bgs and is suspected to serve as an aquitard between the upper water bearing zone and the deeper water bearing zones. A possible seasonal seep was identified at base of the embankment the site (GSI 2003).

10. NATURE AND EXTENT (*Current Understanding*)

The current understanding of the nature and extent of contamination for the uplands portions of the site is summarized in this section. When no data exist for a specific medium, a notation is made.

10.1. Soil

10.1.1. Upland Soil Investigations

☒ Yes ☐ No

After the closure of Riedel Environmental's hazardous materials storage facility in 1986, site investigations detected PCB contamination in soils. Subsequent assessments at the site between 1992 and 1996 indicated additional contamination concerns. MFA completed a site investigation in 1996 and an RI for soil contamination was completed in 2002. Soil samples were collected at numerous locations throughout the site [see Supplemental Figure 6 from MFA (2003b)] and analyzed for PCBs, metals, VOCs, chlorinated phenols, PAHs, petroleum constituents, and dioxin/furans.

In 2002 and 2003, MFA completed a human health risk assessment and Level II screening ecological risk assessment for contaminants in soil. Soil data for selected chemicals of potential concern are summarized in the table below. Sampling locations and the areas of soil contamination exceeding proposed cleanup level concentrations are shown in Supplemental Figure 6 from MFA (2003b)². Chemicals in soils exceeding cleanup level concentrations include benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-c,d)pyrene, arsenic, lead,

² Proposed site-specific soil cleanup levels are shown in Supplemental Table 5 from MFA (2003b). Except for arsenic and lead, soil cleanup levels were calculated based on the human health and ecological risk assessments.

and Aroclor 1260. Additional chemicals of concern in site soil include total petroleum hydrocarbons, acenaphthene, acenaphthylene, benzo[g,h,i]perylene, benzo[k]fluoranthene, fluorene, 2-methylnaphthalene, naphthalene, phenanthrene, pentachlorophenol, Aroclor 1242, Aroclor 1254, 2,3,7,8-tetrachlorodibenzofuran, and 2,3,4,7,8-pentachlorodibenzofuran. Soil cleanup level and hot spot exceedances are summarized in Supplemental Tables 6 and 7 from MFA (2003b).

MFA (2001b) reported that overland flow of sheet runoff is a possible surface water pathway. This overland flow could transport eroded soils to the river.

Chemical	Site-wide				100 feet of Catch Basins			
	N	Detection Frequency (%)	Min.	Max.	N	Detection Frequency (%)	Min.	Max.
Total PCBs (ug/kg)	177	13	0.086	5.02	70	0.24	0.12	5.02
Metals								
Arsenic (mg/kg)	225	98.2	0.1	54	62	98.4	0.1	16
Chromium (mg/kg)	164	100	3.8	110	30	100	3.8	110
Copper (mg/kg)	174	100	0.023	230	30	100	0.023	37
Lead (mg/kg)	180	94.4	0.05	4,260	31	96.8	0.05	98
Zinc (mg/kg)	156	99.4	0.01	730	31	96.8	0.01	100
Volatile Organic Compounds (VOCs)								
Toluene (ug/kg)	142	12.7	0.165	2.2	48	14.6	0.19	1.5
Semivolatile Organic Compounds (SVOCs)								
Benz(a)anthracene (ug/kg)	188	60.1	0.215	36,000	66	65.2	0.215	860
Benzo(a)pyrene (ug/kg)	188	53.2	0.215	75,000	66	51.5	0.215	690
Benzo(b)fluoranthene (ug/kg)	188	59	0.215	65,000	66	56.1	0.215	730
Dibenz(a,h)anthracene (ug/kg)	185	9.7	0.215	6,800	67	6	0.215	6,800
Indeno(1,2,3-c,d)pyrene (ug/kg)	188	38.3	0.215	30,000	67	34.3	0.215	30,000
Pentachlorophenol (ug/kg)	45	20	0.49	4,400	0	--	--	--
Total Petroleum Hydrocarbons (TPH)								
TPH- Diesel (mg/kg)	184	47.3	9.5	26,000	62	77.4	9.5	26,000
TPH - Motor Oil (mg/kg)	184	47.8	19	7,000	62	64.5	21	2,700

Compiled from MFA (2003a)

10.1.2. Riverbank Samples

☐ Yes ☒ No

10.1.3. Summary

The ecological risk assessment (MFA 2003a) evaluated the potential for contaminants in soil to migrate to Willamette River sediment at concentrations that could pose risks to benthic organisms. Concentrations in soil samples collected near the river and near stormwater catch basins were compared to DEQ sediment screening levels (DEQ 2002). Several PAHs and PCBs exceeded these levels. MFA (2003a) concluded that the potential for some PAHs and PCBs in soil to migrate to river sediment at ecologically significant levels could not be ruled out.

10.2. Groundwater

10.2.1. Groundwater Investigations

☒ Yes ☐ No

Geraghty & Miller conducted an expanded preliminary assessment at the site on behalf of a prospective purchaser, Diversified Marine, Inc., in February 1995 (MFA 2002).

As part of the assessment, three monitoring wells were installed near the northwest corner of the property. According to MFA, the report indicates that concentrations of PAHs in groundwater exceeded the MCLs. However, the Geraghty & Miller report is not available in the DEQ file.

Available historical groundwater data collected from temporary well points and monitoring wells (total of approximately 30) are summarized in the RI work plan for soils report (MFA 1999). During the RI field effort in June 1999, the DEQ worked with MFA to collect approximately 20 groundwater samples from direct push borings. The results of the groundwater sampling are summarized in a table generated by the DEQ (Triangle Park Groundwater Data, dated September 29, 1999).

10.2.2. NAPL (Historic & Current)

☐ Yes ☒ No

MFA indicated the presence of LNAPL in the southeast corner of the site (Supplemental Figure 4 from MFA (2003b)); however subsequent testing and evaluation by DEQ indicate that LNAPL is not present at this location.

10.2.3. Dissolved Contaminant Plumes

☒ Yes ☐ No

Four distinct areas of impacted groundwater have been identified within the shallow aquifer at the site. All four areas contain petroleum-related constituents; HVOCs are present in groundwater at two of the four areas. In addition, several areas with isolated detections of petroleum, phthalates, and PCBs also have been identified. The groundwater data also suggest the potential for elevated metals concentrations; however, background groundwater metals concentrations have not been established. Thus, the extent of potentially elevated metals concentrations in groundwater was not estimated.

Plume Characterization Status ☐ Complete ☒ Incomplete

Additional data are necessary to characterize the plumes at the site.

Plume Extent

GSI used available groundwater data to generate a plume map for the site, as shown in Figure 2. GSI met with the DEQ on August 4, 2004 to verify DEQ's understanding of the contaminant distribution at the site. This section describes the plumes at the site.

A plume with petroleum-related constituents and HVOCs is present in the east-central portion of the site. TPH diesel-range petroleum was detected in four groundwater samples within the plume at a maximum concentration of 5.2 mg/L. TPH heavy oil-range petroleum was detected in two groundwater samples at a maximum concentration of 9.94 mg/L. Total HVOCs were detected in six groundwater samples at concentrations up to 10.7 µg/L. This plume appears to have originated in WMA 2 and extends into WMAs 1 and 5 [refer to Supplemental Figure 4-1, MFA (2002)].

A plume consisting of diesel- and heavy oil-range hydrocarbons was identified in northeast corner of the site, and may extend westerly under the railroad tracks toward the river. This plume appears to have originated near the warehouse located in WMA 3 and is related to LNAPL observed in WMA 3. However, bulk fuel also was formerly stored west of this area, and thus more than one source may have contributed to petroleum constituents detected in groundwater. The downgradient extent of petroleum-impacted groundwater in this area has not been determined. Groundwater samples collected from eight locations had petroleum detections. The maximum concentration of TPH diesel-range petroleum detected in groundwater near the

warehouse was 26 mg/L.

A plume consisting of heavy oil-range petroleum constituents was identified in the vicinity of the cove/dock area, located in WMA 5. The origin of this plume appears to be the waste oil AST area. Insufficient data are available to determine whether this plume extends to the Willamette River. Groundwater samples collected from six locations in this area had detections of petroleum. The maximum concentration detected in groundwater samples from this area was 4.16 mg/L of TPH heavy oil-range petroleum; this concentration was detected in a sample obtained from an exploration located at the southeast end of the warehouse building.

Petroleum, including diesel and some heavy oil-range constituents, and HVOCs were identified in groundwater under the northern portion of the site in WMA 6. TPH diesel-range petroleum was detected in groundwater samples from seven locations; the maximum detected concentration was 4.01 mg/L. HVOCs were detected in four groundwater samples with a maximum detected total HVOC concentration of 3 µg/L.

Isolated areas with detected concentrations of COIs in groundwater are present at several locations on the site. Four locations included petroleum detections, 11 included phthalate detections, and one area included a detection of PCBs. Figure 2 shows the location of the plumes and locations with isolated detections in groundwater.

Min/Max Detections

The following table summarizes minimum and maximum concentrations of constituents detected in groundwater samples collected from probe borings, temporary well points, and monitoring wells at the site.

Constituent	Minimum Concentration µg/L	Maximum Concentration µg/L
Total Petroleum Hydrocarbons (TPH)		
TPH-Gasoline	ND	157
TPH-Diesel	ND	26,000
TPH-Oil	ND	9,940
Volatile Organic Compounds (VOCs)		
Benzene	ND	1.6
Toluene	ND	21
4-Isopropyltoluene	ND	1.1
1,1-Dichloroethane	ND	4.6
sec-Butylbenzene	ND	8
tert- Butylbenzene	ND	5
cis1,2-Dichloroethene	ND	1.4
Tetrachloroethene	ND	1.0
1,1,1 Trichloroethane	ND	5.1
Vinyl chloride	ND	2
Carbon disulfide	ND	1
Methyl ethyl ketone	ND	4
PCBs		
PCBs	ND	0.27
Semivolatile Organic Compounds (SVOCs)		
Bis(2-ethylhexyl)phthalate	ND	92
Bis(2-ethylhexyl)adipate	ND	3
Di-n-butylphthalate	ND	7
Butylbenzylphthalate	ND	2
Acenaphthylene	ND	1
Anthracene	ND	2.1
Benz(a)anthracene	ND	59
Benz(a)pyrene	ND	31
Benzo(b)fluoranthene	ND	3.2
Benzo(g,h,i)perylene	ND	31
Chrysene	ND	33
Dibenz(a,h)anthracene	ND	34
Fluoranthene	ND	77
Fluorene	ND	3
Indeno(1,2,3-cd)pyrene	ND	34
Phenanthrene	ND	19
Pyrene	ND	86

µg/L = micrograms per liter

ND = not detected (method detection limit not reported on available records)

Current Plume Data

Based on the data reviewed by GSI, the current estimated extent of the petroleum plume in the shallow aquifer is shown in Figure 2.

Preferential Pathways

Buried pipes and utilities exist at the site. However, no information has been presented regarding locations or depth relative to the shallow groundwater table to determine if the utilities and associated backfill may be a preferential pathway at the site.

Downgradient Plume Monitoring Points (min/max detections)

The following table summarizes minimum and maximum concentrations of constituents detected at downgradient monitoring point locations [GP-105, GP-126, GP-125, GP-79, GP-89, GP-81, GP-85, GP-73, GP-61, GP-58, and GP-54, shown on Supplemental Figure 4-1(MFA 2002)] nearest the river. The maximum concentration of TPH-oil range petroleum detected in explorations nearest the river was detected in GP-126, located on the north side of the cove [Supplemental Figure 4-1(MFA, 2002)].

Constituent	Minimum Concentration mg/L	Maximum Concentration mg/L
Total Petroleum Hydrocarbons (TPH)		
TPH-Oil range hydrocarbons	ND	2.8
PCBs		
PCBs	ND	0.00027
Semi-volatile Organic Compounds (SVOCs)		
Bis(2-ethylhexyl)phthalate	ND	0.002
Di-n-butylphthalate	ND	0.001
Benz(a)anthracene	ND	0.001
Benzo(b)fluoranthene	ND	0.006
Chrysene	ND	0.002
Fluoranthene	ND	0.003
Fluorene	ND	0.001
Phenanthrene	ND	0.002
Pyrene	ND	0.004

µg/L = micrograms per liter

ND = not detected (method detection limit not reported on available records)

Visual Seep Sample Data

☐ Yes ☒ No

No seep sample data are available.

Nearshore Porewater Data

Metals and butyltins were analyzed in four sediment porewater samples collected during the Portland Harbor Sediment Investigation (Weston 1998). These data are listed in Table 2.

Groundwater Plume Temporal Trend

Insufficient data are available to assess plume distributions over time.

10.2.4. Summary

Limited shallow groundwater investigations at the site have identified four distinct areas of impacted groundwater. All four impacted groundwater areas contain diesel or heavy –range petroleum-related constituents; two impacted areas contain HVOCs; and several isolated areas of phthalates, potentially metals and PCBs. Groundwater flow in the shallow aquifer is generally towards the west ultimately discharges from the

shallow aquifer to the river. Insufficient data is available to assess temporal groundwater trends at the site.

No information has been presented regarding the depths of the utilities at the facility relative to the shallow groundwater table and other potential preferential groundwater pathways at the site.

10.3. Surface Water

10.3.1. Surface Water Investigation ☐ Yes ☒ No

10.3.2. General or Individual Stormwater Permit (Current or Past) ☐ Yes ☒ No

DEQ's wastewater permits database (DEQ 2004b) did not have any record of stormwater discharge permits for Riedel, the most recent operator at the site. Stormwater permit monitoring requirements began after Riedel ceased operation.

Two private outfalls, WR-214 and WR-248, are located on the site (Figure 1). The source of these private outfalls is unknown (MFA 2001b). However, MFA (2001b) also reported that surface water from the site most likely discharges to the river by overland flow and through these two private outfalls. There are several catch basins located on the property.

Do other non-stormwater wastes discharge to the system? ☐ Yes ☒ No

The site is currently unoccupied and there is no non-stormwater discharge to the system. It is unknown if there was possible historical discharge.

10.3.3. Stormwater Data ☐ Yes ☒ No

10.3.4. Catch Basin Solids Data ☐ Yes ☒ No

10.3.5. Wastewater Permit ☐ Yes ☒ No

DEQ's wastewater permits database (DEQ 2004b) did not have any record of wastewater discharge permits for Riedel, the most recent operator at the site.

10.3.6. Wastewater Data ☐ Yes ☒ No

10.3.7. Summary

There are potential stormwater transport pathways to the river (either overland or direct discharge); however, drainage pathways and stormwater quality are unknown. Historical stormwater and wastewater discharge are also unknown.

10.4. Sediment

10.4.1. River Sediment Data ☒ Yes ☐ No

The following investigations collected sediment data offshore of Triangle Park:

- Sediment investigation for Triangle Park 1996 – 1997 (MFA 1999)
- Portland Harbor Sediment Investigation, 1997 (Weston 1998).

Single samples near the southern property boundary were collected in two investigations at the Portland Shipyard (ECSI #271). Additional data have also been collected downstream of Triangle Park as part of McCormick and Baxter (ECSI #74) investigations. Additional sediment sampling is proposed for Round 2 of the LWR

RI. All station locations in the vicinity of Triangle Park are shown in Figure 1³.

Sediment data collected at Triangle Park are summarized in Table 2. Each chemical was analyzed in 3-15 sediment samples. Metals and butyltins were also analyzed in four sediment porewater samples (Weston 1998). Metals, HPAH, and tributyltin were the most frequently detected chemicals in both surface and subsurface sediments.

10.4.2. Summary

See Final CSM Update.

11. CLEANUP HISTORY AND SOURCE CONTROL MEASURES

11.1. Soil Cleanup/Source Control

Soil cleanup and source control actions included removal of 125 cubic yards of PCB-contaminated soil from the storage area southeast of Building 2 in the late 1980s – early 1990s.

11.2. Groundwater Cleanup/Source Control

No groundwater source controls have been conducted at the site.

11.3. Other

Other cleanup and source control measures (DEQ 2004) included:

- Waste storage tank, drum, sandblast grit, debris removal (early – mid-1990s)
- Six USTs decommissioned in 1993.

11.4. Potential for Recontamination from Upland Sources

See Final CSM Update.

12. BIBLIOGRAPHY / INFORMATION SOURCES

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Figures:

- Figure 1. Site Features
- Figure 2. Extent of Impacted Groundwater

Tables:

- Table 1. Potential Sources and Transport Pathways Assessment
- Table 2. Queried Sediment Chemistry Data

Supplemental Scanned Figures:

- Exhibit "A" Waterway Lease Information
- Figure 4. Historical Site Use and Potential Environmental Concerns (MFA 2003b)
- Figure 4-1. Location of Geologic Cross Sections (MFA 2002)
- Figure 4-2. Cross Section A-A' (MFA 2002)
- Figure 4-3. Cross Section B-B' (MFA 2002)
- Figure 4-4. Cross Section C-C' (MFA 2002)
- Figure 4-5. Cross Sections D-D' and E-E' (MFA 2002)
- Figure 6. Soil Volumes Exceeding Cleanup Level Concentrations (MFA 2003b)

Supplemental Tables:

- Table 5. Proposed Soil Cleanup and Hot Spot Levels (MFA 2003b)
- Table 6. Soil Volumes Exceeding Cleanup Level Concentrations (MFA 2003b)
- Table 7. Soil Volumes Exceeding Hot Spot Concentrations (MFA 2003b)

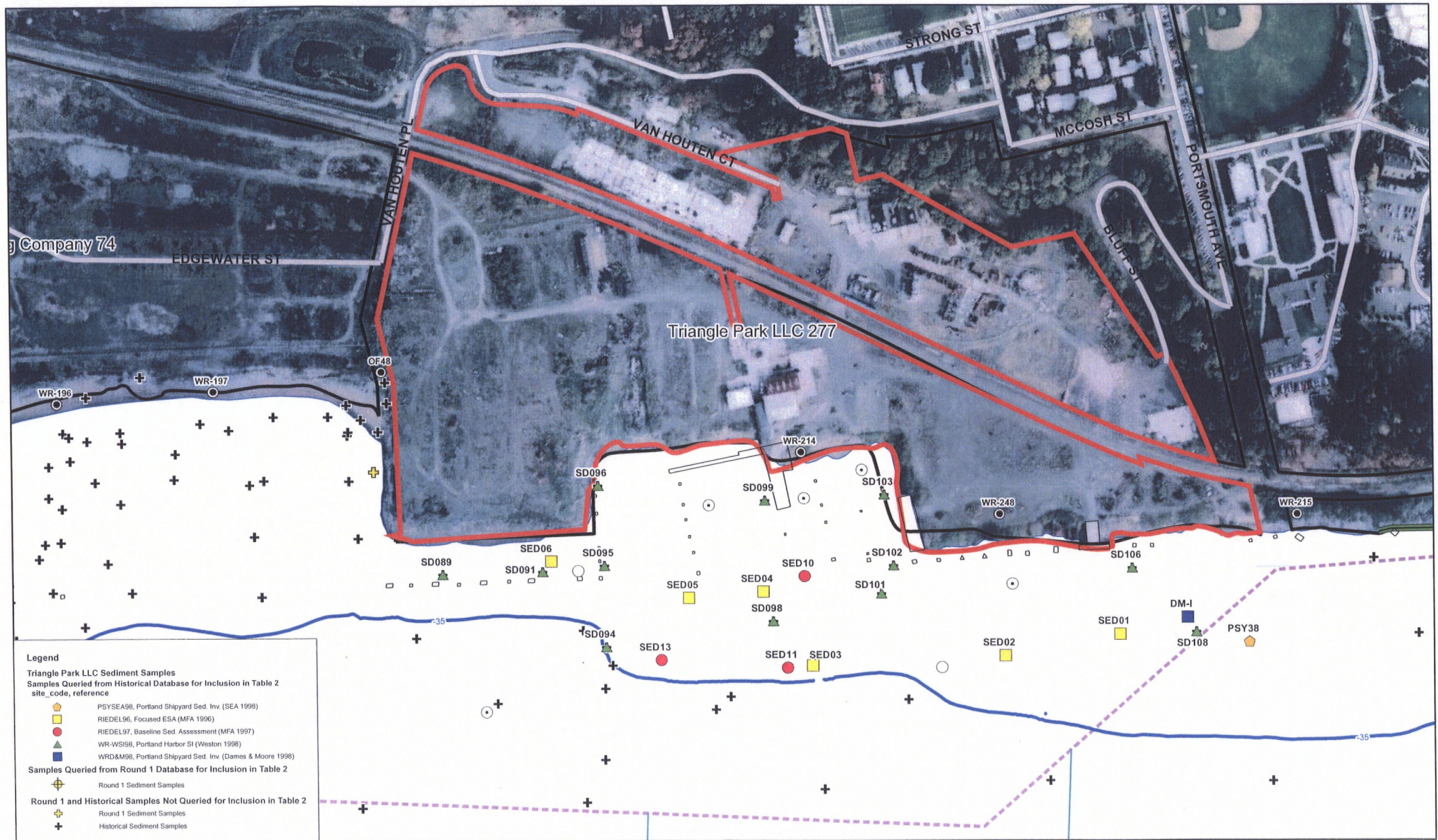
FIGURES

Figure 1. Site Features

Figure 2. Upland Groundwater Quality Overview

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Map Document: (C:\GIS\Projects\Portland_Harbor\LWG-Map-Projects\Conceptual_Site_Model\Sample_Locations_3rd_Group.mxd)
 09/19/2005 -- 11:59:26 AM

Aerial Photo Date: October 2001.
 Base Map features from Portland Metro's RLIS

Outfall information contained on this map is accurate according to available records, however, the City of Portland makes no warranty, expressed or implied, as to the completeness or accuracy of the information published (updated June 2005).

Legend

- Outfalls
- Seep Photo Location (Not location of actual Seep)
- Selected ECSI Site Property Boundary
- Navigation Channel
- Docks & In-water Structures
- River Miles
- 35ft Contour (NAVD 88)
- Human Use Areas
- Dockside Worker
- Recreational Beach Use
- Transient
- LWG Round 2 Proposed Sediment Samples
- Surface Sample Only
- Core & Surface Sample

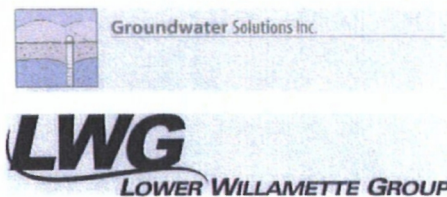
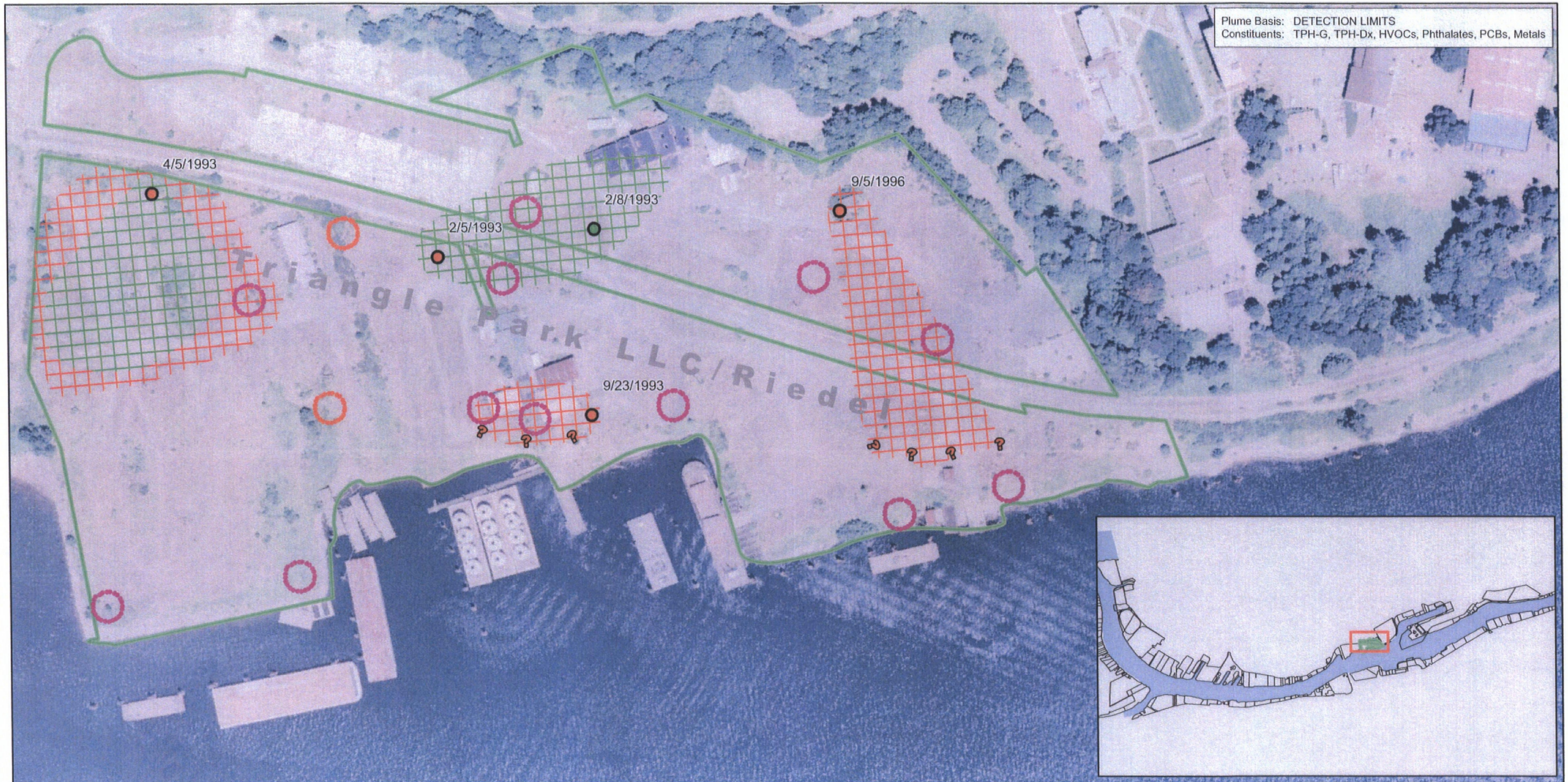
DRAFT

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0 50 100 200 Feet

Figure 1-Site Features
 Portland Harbor RI/FS
 Conceptual Site Model
 Triangle Park LLC
 ECSI 277

DRAFT



0 150 300 Feet

FEATURE SOURCES:
Transportation, Water, Property, Zoning or Boundaries: Metro RLIS.
ECSI site locations were summarized in December, 2002
and January, 2003 from ODEQ ECSI files.

Map Creation Date: August 11, 2004

File Name: Fig2_TrianglePark_SummaryMap.mxd

LEGEND

- Site Boundary
- Maximum Detection Location

Contaminant Type

- Petroleum related
- SVOC (bis(2-ethylhexyl)phthalate, or PAHs)
- VOCs (HVOCs)

Extent of Impacted Groundwater

For details, refer to plume interpretation table in CSM document.

- Single or isolated detection of COI's. Extent or continuity of impacted groundwater between sample points is uncertain. Color based on contaminant type.
- Estimated extent of impacted groundwater area. Color based on contaminant type.

Figure 2
Portland Harbor RI/FS
Triangle Park LLC/Riedel
Upland Groundwater Quality Overview

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TABLES

Table 1. Potential Sources and Transport Pathways Assessment

Table 2. Queried Sediment Chemistry Data

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Table 1. Potential Sources and Transport Pathways Assessment.

Last Updated: September 17, 2004

¹ All information provided in this table is referenced in the site summaries. If information is not available or inconclusive, a ? may be used, as appropriate. No new information is provided in this table.

✓ = Source, COI are present or current or historic pathway is determined to be complete or potentially complete.

? = There is not enough information to determine if source or COI is present or if pathway is complete.

Blank = Source, COI and historic and current pathways have been investigated and shown to be not present or incomplete.

UST Underground storage tank

OST	Underground storage tank
AST	Above-ground storage tank

AST	Above-ground storage tank
TPH	Total petroleum hydrocarbons

TPH	Total petroleum hydrocarbon
VOCs	Volatile organic compounds

SVOCs Semivolatile organic compounds

PAHs Polycyclic aromatic hydrocarbons

PAHS	Polycyclic aromatic hydrocarbons
BTEX	Benzene, toluene, ethylbenzene, and xylenes

BTEX	Benzene, toluene, ethylbenzene
PCBs	Polychlorinated biphenols

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Table 2. Queried Sediment Chemistry Data.

Surface or Subsurface	Analyte	Units	Number of Samples	Number Detected	% Detected	Detected Concentrations					Detected and Nondetected Concentrations				
						Minimum	Maximum	Mean	Median	95th	Minimum	Maximum	Mean	Median	95th
surface	Aroclor 1016	(ug/kg)	5	0	0						10 U	20 U	18	20 U	20 U
surface	Aroclor 1242	(ug/kg)	5	0	0						10 U	20 U	18	20 U	20 U
surface	Aroclor 1248	(ug/kg)	5	0	0						10 U	20 U	18	20 U	20 U
surface	Aroclor 1254	(ug/kg)	5	1	20	200	200	200	200	200	10 U	200	54.2	20 U	21 UI
surface	Aroclor 1260	(ug/kg)	5	0	0						10 U	49 UI	23.8	20 U	20 U
surface	Aroclor 1221	(ug/kg)	5	0	0						10 U	40 U	33.6	39 U	40 U
surface	Aroclor 1232	(ug/kg)	5	0	0						10 U	20 U	18	20 U	20 U
surface	Polychlorinated biphenyl	(ug/kg)	5	1	20	200 A	200 A	200	200 A	200 A	10 UA	200 A	65.8	40 UA	40 UA
surface	Butyltin ion	(ug/kg)	15	1	6.67	2 G	2 G	2	2 G	2 G	1 UG	5.9 U	5.19	5.8 U	5.9 U
surface	Dibutyltin ion	(ug/kg)	15	3	20	2	33	14.3	8	8	2	33	7.52	5.8 U	8
surface	Tributyltin ion	(ug/kg)	16	16	100	3	380	161	160	310 J	3	380	161	160	310 J
surface	Tetrabutyltin	(ug/kg)	15	0	0						1 U	5.9 U	5.19	5.8 U	5.9 U
surface	Total solids	(%)	4	4	100	38.4	63.4	51	41.5	60.6	38.4	63.4	51	41.5	60.6
surface	Total organic carbon	(%)	15	15	100	1.2 J	2.52	1.51	1.3	1.99	1.2 J	2.52	1.51	1.3	1.99
surface	Acid Volatile Sulfides	(mg/kg)	1	0	0						1.7 U	1.7 U	1.7	1.7 U	1.7 U
surface	Total volatile solids	(%)	1	1	100	7.57	7.57	7.57	7.57	7.57	7.57	7.57	7.57	7.57	7.57
surface	Gravel	(%)	9	9	100	0.02	1.89	0.283	0.06	0.15	0.02	1.89	0.283	0.06	0.15
surface	Sand	(%)	15	15	100	6.5	50.92	25.5	26.98	41.23	6.5	50.92	25.5	26.98	41.23
surface	Fines	(%)	14	14	100	48.93	93.5	73.3	71.73	88.5	48.93	93.5	73.3	71.73	88.5
surface	Silt	(%)	14	14	100	41.94	80.4	63.5	61.68	78.84	41.94	80.4	63.5	61.68	78.84
surface	Clay	(%)	14	14	100	5.58	11.89	9.17	9.48	11.68	5.58	11.89	9.17	9.48	11.68
surface	Aluminum	(mg/kg)	12	12	100	33200	45500	40500	40500	45000	33200	45500	40500	40500	45000
surface	Antimony	(mg/kg)	13	7	53.8	6 J	8 J	7	7 J	8 J	0.1 UG	8 J	5.7	6 J	8 J
surface	Arsenic	(mg/kg)	17	5	29.4	3.85	6	4.57	4	5	3.85	6	4.87	5 U	5 U
surface	Cadmium	(mg/kg)	14	14	100	0.2	1.41	0.415	0.3	0.5	0.2	1.41	0.415	0.3	0.5
surface	Chromium	(mg/kg)	17	17	100	24	40.7	34.9	37.1	38.2	24	40.7	34.9	37.1	38.2
surface	Copper	(mg/kg)	17	17	100	37.5	85.3	47.3	44.9	56	37.5	85.3	47.3	44.9	56
surface	Lead	(mg/kg)	17	17	100	9	35	16.6	14	28	9	35	16.6	14	28
surface	Manganese	(mg/kg)	13	13	100	539	736	673	676	725	539	736	673	676	725
surface	Mercury	(mg/kg)	14	14	100	0.04	0.263	0.0695	0.05	0.08	0.04	0.263	0.0695	0.05	0.08
surface	Nickel	(mg/kg)	14	14	100	18.9	31	28.2	29.4	30	18.9	31	28.2	29.4	30
surface	Selenium	(mg/kg)	12	12	100	9	18	12.8	13	15	9	18	12.8	13	15
surface	Silver	(mg/kg)	14	13	92.9	0.1	1.1	0.8	0.7	1.1	0.1	1.1	0.814	0.7	1.1
surface	Thallium	(mg/kg)	12	11	91.7	8	17	13	13	17	5 U	17	12.3	13	17
surface	Zinc	(mg/kg)	14	14	100	74.6	117 J	94.6	91.8 J	113 J	74.6	117 J	94.6	91.8 J	113 J
surface	Barium	(mg/kg)	12	12	100	167	190	182	181	190	167	190	182	181	190
surface	Beryllium	(mg/kg)	12	12	100	0.5	0.7	0.623	0.6	0.7	0.5	0.7	0.623	0.6	0.7
surface	Calcium	(mg/kg)	12	12	100	7910	9190	8650	8530	9030	7910	9190	8650	8530	9030
surface	Cobalt	(mg/kg)	12	12	100	17.7 J	19.4 J	18.7	18.8 J	19.2 J	17.7 J	19.4 J	18.7	18.8 J	19.2 J
surface	Iron	(mg/kg)	13	13	100	33300	45200	42200	42800	44200	33300	45200	42200	42800	44200
surface	Magnesium	(mg/kg)	12	12	100	6160	7860	7080	7080	7360	6160	7860	7080	7080	7360
surface	Potassium	(mg/kg)	12	12	100	1210	1570	1360	1360	1560	1210	1570	1360	1360	1560
surface	Sodium	(mg/kg)	12	12	100	1030	1460	1220	1160	1370	1030	1460	1220	1160	1370
surface	Tin	(mg/kg)	1	1	100	0.891 X	0.891 X	0.891	0.891 X	0.891 X	0.891 X	0.891 X	0.891	0.891 X	0.891 X
surface	Titanium	(mg/kg)	13	13	100	1300	2190	1990	2040	2140	1300	2190	1990	2040	2140
surface	Vanadium	(mg/kg)	12	12	100	99.4	112	105	106	108	99.4	112	105	106	108
surface	2-Methylnaphthalene	(ug/kg)	14	1	7.14	6	6	6	6	6	6	20 U	17.8	19 U	20 U
surface	Acenaphthene	(ug/kg)	15	2	13.3	13	23	18	13	13	6.7 U	23	17.7	19 U	20 U
surface	Acenaphthylene	(ug/kg)	15	1	6.67	29	29	29	29	29	5 U	29	17.6	19 U	20 U

Table 2. Queried Sediment Chemistry Data.

Surface or Subsurface	Analyte	Units	Number of Samples	Number Detected	% Detected	Detected Concentrations					Detected and Nondetected Concentrations				
						Minimum	Maximum	Mean	Median	95th	Minimum	Maximum	Mean	Median	95th
surface	Anthracene	(ug/kg)	15	3	20	18	45	29	24	24	6.7 U	45	19.8	19 U	24
surface	Fluorene	(ug/kg)	15	2	13.3	18	35	26.5	18	18	6.7 UJ	35	18.8	19 U	20 U
surface	Naphthalene	(ug/kg)	15	3	20	8.54	23	13.5	9	9	8.54	23	17.6	19 U	20 U
surface	Phenanthrene	(ug/kg)	15	10	66.7	17	310	74.7	26	111	17	310	56.2	22	111
surface	Low Molecular Weight PAH	(ug/kg)	15	10	66.7	17 A	413 A	99.2	42.34 A	169 A	17 A	413 A	72.6	22 A	169 A
surface	Dibenz(a,h)anthracene	(ug/kg)	15	4	26.7	15	72	34.4	21	29.5	10 U	72	22.7	19 U	29.5
surface	Benz(a)anthracene	(ug/kg)	15	6	40	19	240	85.3	42	120	19	240	45.7	20 U	120
surface	Benzo(a)pyrene	(ug/kg)	15	7	46.7	19 J	400	93.7	35.2	82	19 U	400	54	20 U	82
surface	Benzo(b)fluoranthene	(ug/kg)	15	8	53.3	20	240	73.1	45.4	100	19 U	240	48	20	100
surface	Benzo(g,h,i)perylene	(ug/kg)	15	5	33.3	17	380	107	43	64	17	380	48.5	19 U	64
surface	Benzo(k)fluoranthene	(ug/kg)	15	6	40	15	260	88.9	42	100	15	260	47.2	20 U	100
surface	Chrysene	(ug/kg)	15	12	80	19	280	74	23	210	19 U	280	63.1	23	210
surface	Fluoranthene	(ug/kg)	15	15	100	26	590	131	35	550	26	590	131	35	550
surface	Indeno(1,2,3-cd)pyrene	(ug/kg)	15	5	33.3	22	300	91.4	42	66	19 U	300	43.3	20 U	66
surface	Pyrene	(ug/kg)	15	15	100	23	770	132	34	440	23	770	132	34	440
surface	Benzo(b+k)fluoranthene	(ug/kg)	15	8	53.3	20 A	500 A	140	73.8 A	200 A	19 UA	500 A	83.5	20 A	200 A
surface	High Molecular Weight PAH	(ug/kg)	15	15	100	49 A	3492 A	549	108 A	1748 A	49 A	3492 A	549	108 A	1748 A
surface	Polycyclic Aromatic Hydrocarbons	(ug/kg)	15	15	100	49 A	3655 A	615	138 A	2161 A	49 A	3655 A	615	138 A	2161 A
surface	4,4'-DDD	(ug/kg)	1	0	0						2 U	2 U	2	2 U	2 U
surface	4,4'-DDE	(ug/kg)	1	0	0						2.9 UI	2.9 UI	2.9	2.9 UI	2.9 UI
surface	4,4'-DDT	(ug/kg)	1	0	0						5.3 UI	5.3 UI	5.3	5.3 UI	5.3 UI
surface	Total of 3 isomers: pp-DDT,-DDD,-DDE	(ug/kg)	1	0	0						5.3 UA	5.3 UA	5.3	5.3 UA	5.3 UA
surface	Aldrin	(ug/kg)	1	0	0						1.8 UI	1.8 UI	1.8	1.8 UI	1.8 UI
surface	alpha-Hexachlorocyclohexane	(ug/kg)	1	0	0						0.98 U	0.98 U	0.98	0.98 U	0.98 U
surface	beta-Hexachlorocyclohexane	(ug/kg)	1	0	0						0.98 U	0.98 U	0.98	0.98 U	0.98 U
surface	delta-Hexachlorocyclohexane	(ug/kg)	1	0	0						1.5 UI	1.5 UI	1.5	1.5 UI	1.5 UI
surface	gamma-Hexachlorocyclohexane	(ug/kg)	1	0	0						0.98 U	0.98 U	0.98	0.98 U	0.98 U
surface	cis-Chlordane	(ug/kg)	1	0	0						0.98 U	0.98 U	0.98	0.98 U	0.98 U
surface	Dieldrin	(ug/kg)	1	0	0						2 UI	2 UI	2	2 UI	2 UI
surface	alpha-Endosulfan	(ug/kg)	1	0	0						1.3 UI	1.3 UI	1.3	1.3 UI	1.3 UI
surface	beta-Endosulfan	(ug/kg)	1	0	0						2 U	2 U	2	2 U	2 U
surface	Endosulfan sulfate	(ug/kg)	1	0	0						2 U	2 U	2	2 U	2 U
surface	Endrin	(ug/kg)	1	0	0						5 UI	5 UI	5	5 UI	5 UI
surface	Endrin aldehyde	(ug/kg)	1	0	0						6.4 UI	6.4 UI	6.4	6.4 UI	6.4 UI
surface	Endrin ketone	(ug/kg)	1	0	0						12 UIJ	12 UIJ	12	12 UIJ	12 UIJ
surface	Heptachlor	(ug/kg)	1	0	0						0.98 U	0.98 U	0.98	0.98 U	0.98 U
surface	Heptachlor epoxide	(ug/kg)	1	0	0						0.98 U	0.98 U	0.98	0.98 U	0.98 U
surface	Methoxychlor	(ug/kg)	1	0	0						10 UI	10 UI	10	10 UI	10 UI
surface	Toxaphene	(ug/kg)	1	0	0						98 U	98 U	98	98 U	98 U
surface	gamma-Chlordane	(ug/kg)	1	0	0						3.2 UI	3.2 UI	3.2	3.2 UI	3.2 UI
surface	2,4,5-Trichlorophenol	(ug/kg)	13	0	0						40 U	99 U	92.5	97 U	98 U
surface	2,4,6-Trichlorophenol	(ug/kg)	13	0	0						30 U	99 U	91.8	97 U	98 U
surface	2,4-Dichlorophenol	(ug/kg)	13	0	0						57 U	100 U	61.5	58 U	59 U
surface	2,4-Dimethylphenol	(ug/kg)	13	0	0						19 U	20 U	19.5	19 U	20 U
surface	2,4-Dinitrophenol	(ug/kg)	12	0	0						190 UJ	300 U	203	190 UJ	200 UJ
surface	2-Chlorophenol	(ug/kg)	13	0	0						19 U	50 U	21.8	19 U	20 U
surface	2-Methylphenol	(ug/kg)	13	0	0						19 U	100 U	25.6	19 U	20 U
surface	2-Nitrophenol	(ug/kg)	13	0	0						40 U	99 U	92.5	97 U	98 U
surface	4,6-Dinitro-2-methylphenol	(ug/kg)	13	0	0						100 U	200 U	187	190 U	200 U

Table 2. Queried Sediment Chemistry Data.

Surface or Subsurface	Analyte	Units	Number of Samples	Number Detected	% Detected	Detected Concentrations					Detected and Nondetected Concentrations				
						Minimum	Maximum	Mean	Median	95th	Minimum	Maximum	Mean	Median	95th
surface	4-Chloro-3-methylphenol	(ug/kg)	13	0	0						38 U	50 U	39.8	39 U	40 U
surface	4-Methylphenol	(ug/kg)	13	12	92.3	210	680	363	320	480	100 U	680	343	320	480
surface	4-Nitrophenol	(ug/kg)	13	0	0						94 U	100 U	97.2	97 U	99 U
surface	Pentachlorophenol	(ug/kg)	13	0	0						94 UJ	100 U	97.2	97 UJ	99 UJ
surface	Phenol	(ug/kg)	13	0	0						19 U	50 U	21.8	19 U	20 U
surface	Dimethyl phthalate	(ug/kg)	14	0	0						10 U	20 U	18.3	19 U	20 U
surface	Diethyl phthalate	(ug/kg)	14	0	0						10 U	20 U	18.3	19 U	20 U
surface	Dibutyl phthalate	(ug/kg)	13	2	15.4	12	26.7	19.4	12	12	12	26.7	19.4	19 U	20 U
surface	Butylbenzyl phthalate	(ug/kg)	14	2	14.3	23.1	25	24.1	23.1	23.1	19 U	25	20.1	19 U	23.1
surface	Di-n-octyl phthalate	(ug/kg)	14	2	14.3	47	10100 B	5070	47	47	19 U	10100 B	741	19 U	47
surface	Bis(2-ethylhexyl) phthalate	(ug/kg)	14	7	50	86 J	7330 B	1190	140	320	86 J	7330 B	653	120 U	320
surface	Bis(2-chloro-1-methylethyl) ether	(ug/kg)	12	0	0						19 UJ	20 UJ	19.4	19 UJ	20 UJ
surface	2,4-Dinitrotoluene	(ug/kg)	12	0	0						94 U	99 U	96.9	97 U	98 U
surface	2,6-Dinitrotoluene	(ug/kg)	12	0	0						94 U	99 U	96.9	97 U	98 U
surface	2-Chloronaphthalene	(ug/kg)	12	0	0						19 U	20 U	19.4	19 U	20 U
surface	2-Nitroaniline	(ug/kg)	12	0	0						94 UJ	99 U	96.9	97 U	98 UJ
surface	3,3'-Dichlorobenzidine	(ug/kg)	12	0	0						94 U	99 UJ	96.9	97 UJ	98 U
surface	3-Nitroaniline	(ug/kg)	12	0	0						110 UJ	120 U	118	120 U	120 U
surface	4-Bromophenyl phenyl ether	(ug/kg)	12	0	0						19 U	20 U	19.4	19 U	20 U
surface	4-Chloroaniline	(ug/kg)	12	0	0						57 UJ	59 U	58.3	58 UJ	59 U
surface	4-Chlorophenyl phenyl ether	(ug/kg)	12	0	0						19 U	20 U	19.4	19 U	20 U
surface	4-Nitroaniline	(ug/kg)	12	0	0						94 U	99 UJ	96.9	97 UJ	98 U
surface	Benzoic acid	(ug/kg)	12	0	0						190 U	200 UJ	194	190 UJ	200 UJ
surface	Benzyl alcohol	(ug/kg)	12	0	0						19 UJ	20 U	19.4	19 U	20 U
surface	Bis(2-chloroethoxy) methane	(ug/kg)	12	0	0						19 U	20 U	19.4	19 U	20 U
surface	Bis(2-chloroethyl) ether	(ug/kg)	12	0	0						38 UJ	40 UJ	38.9	39 U	39 U
surface	Carbazole	(ug/kg)	12	1	8.33	54 J	54 J	54	54 J	54 J	19 UJ	54 J	22.3	19 U	20 U
surface	Dibenzofuran	(ug/kg)	14	2	14.3	10	24	17	10	10	10 U	24	18.4	19 U	20 U
surface	Hexachlorobenzene	(ug/kg)	12	0	0						19 U	20 U	19.4	19 U	20 U
surface	Hexachlorobutadiene	(ug/kg)	12	0	0						19 U	20 U	19.4	19 U	20 U
surface	Hexachlorocyclopentadiene	(ug/kg)	12	0	0						94 U	99 UJ	96.9	97 UJ	98 U
surface	Hexachloroethane	(ug/kg)	12	0	0						19 U	20 U	19.4	19 U	20 U
surface	Isophorone	(ug/kg)	12	0	0						19 U	20 U	19.4	19 U	20 U
surface	Nitrobenzene	(ug/kg)	12	0	0						19 U	20 U	19.4	19 U	20 U
surface	N-Nitrosodipropylamine	(ug/kg)	12	0	0						38 U	40 U	38.9	39 U	39 UJ
surface	N-Nitrosodiphenylamine	(ug/kg)	12	0	0						19 UJ	20 U	19.4	19 U	20 U
surface	1,2-Dichlorobenzene	(ug/kg)	12	0	0						19 U	20 U	19.4	19 U	20 U
surface	1,3-Dichlorobenzene	(ug/kg)	12	0	0						19 U	20 U	19.4	19 U	20 U
surface	1,4-Dichlorobenzene	(ug/kg)	12	0	0						19 U	20 U	19.4	19 U	20 U
surface	1,2,4-Trichlorobenzene	(ug/kg)	12	0	0						19 U	20 U	19.4	19 U	20 U
surface	Porewater														
surface	Butyltin ion	(ug/l)	1	0	0						0.06 U	0.06 U	0.06	0.06 U	0.06 U
surface	Dibutyltin ion	(ug/l)	4	0	0						0.06 U	0.06 U	0.06	0.06 U	0.06 U
surface	Tributyltin ion	(ug/l)	5	0	0						0.02 U	0.025 U	0.021	0.02 UJ	0.02 U
surface	Tetrabutyltin	(ug/l)	4	0	0						0.02 U	0.02 U	0.02	0.02 U	0.02 U
surface	Ammonia	(mg/l)	1	1	100	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
surface	Aluminum	(mg/l)	4	4	100	0.03	0.11	0.075	0.06	0.1	0.03	0.11	0.075	0.06	0.1
surface	Antimony	(mg/l)	4	0	0						0.05 U	0.05 U	0.05	0.05 U	0.05 U

Table 2. Queried Sediment Chemistry Data.

Surface or Subsurface	Analyte	Units	Number of Samples	Number Detected	% Detected	Detected Concentrations					Detected and Nondetected Concentrations				
						Minimum	Maximum	Mean	Median	95th	Minimum	Maximum	Mean	Median	95th
surface	Arsenic	(mg/l)	4	4	100	0.001	0.003	0.002	0.002	0.002	0.001	0.003	0.002	0.002	0.002
surface	Cadmium	(mg/l)	4	0	0						0.002 U	0.002 U	0.002	0.002 U	0.002 U
surface	Chromium	(mg/l)	4	0	0						0.005 U	0.005 U	0.005	0.005 U	0.005 U
surface	Copper	(mg/l)	4	0	0						0.002 U	0.002 U	0.002	0.002 U	0.002 U
surface	Lead	(mg/l)	4	0	0						0.001 U	0.001 U	0.001	0.001 U	0.001 U
surface	Manganese	(mg/l)	4	4	100	3.85	12.9	8.68	7.68	10.3	3.85	12.9	8.68	7.68	10.3
surface	Mercury	(mg/l)	4	0	0						0.0001 U	0.0001 U	0.0001	0.0001 U	0.0001 U
surface	Nickel	(mg/l)	4	0	0						0.01 U	0.01 U	0.01	0.01 U	0.01 U
surface	Selenium	(mg/l)	4	0	0						0.001 U	0.001 U	0.001	0.001 U	0.001 U
surface	Silver	(mg/l)	4	0	0						0.0002 U	0.0002 U	0.0002	0.0002 U	0.0002 U
surface	Thallium	(mg/l)	4	0	0						0.001 U	0.001 U	0.001	0.001 U	0.001 U
surface	Zinc	(mg/l)	4	4	100	0.005	0.007	0.0063	0.006	0.007	0.005	0.007	0.0063	0.006	0.007
surface	Barium	(mg/l)	4	4	100	0.054	0.123	0.0923	0.085	0.107	0.054	0.123	0.0923	0.085	0.107
surface	Beryllium	(mg/l)	4	0	0						0.001 U	0.001 U	0.001	0.001 U	0.001 U
surface	Calcium	(mg/l)	4	4	100	48.5	115	82.8	71.2	96.3	48.5	115	82.8	71.2	96.3
surface	Cobalt	(mg/l)	4	4	100	0.006	0.014	0.011	0.012	0.012	0.006	0.014	0.011	0.012	0.012
surface	Iron	(mg/l)	4	4	100	4.18	12.1	8.22	5.11	11.5	4.18	12.1	8.22	5.11	11.5
surface	Magnesium	(mg/l)	4	4	100	16.3	40.3	28.3	24.1	32.4	16.3	40.3	28.3	24.1	32.4
surface	Potassium	(mg/l)	4	4	100	2	3.6	3.18	3.5	3.6	2	3.6	3.18	3.5	3.6
surface	Sodium	(mg/l)	4	4	100	10.4	13.6	12.1	11.5	13	10.4	13.6	12.1	11.5	13
surface	Vanadium	(mg/l)	4	2	50	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003 U	0.003 U
subsurface	Aroclor 1016	(ug/kg)	8	0	0						19 U	200 U	142	200 U	200 U
subsurface	Aroclor 1242	(ug/kg)	8	0	0						19 U	200 U	142	200 U	200 U
subsurface	Aroclor 1248	(ug/kg)	8	0	0						19 U	200 U	142	200 U	200 U
subsurface	Aroclor 1254	(ug/kg)	8	2	25	15 J	70	42.5	15 J	15 J	15 J	200 U	148	200 U	200 U
subsurface	Aroclor 1260	(ug/kg)	8	1	12.5	160	160	160	160	160	19 UJ	200 U	160	200 U	200 U
subsurface	Aroclor 1221	(ug/kg)	8	0	0						38 U	200 U	147	200 U	200 U
subsurface	Aroclor 1232	(ug/kg)	8	0	0						19 U	200 U	142	200 U	200 U
subsurface	Polychlorinated biphenyl	(ug/kg)	8	2	25	15 A	230 A	123	15 A	15 A	15 A	230 A	168	200 UA	200 UA
subsurface	Butyltin ion	(ug/kg)	15	7	46.7	1 G	66 G	19.3	8	49	1 UGH	66 G	10.7	3 U	49
subsurface	Dibutyltin ion	(ug/kg)	15	9	60	2 H	830	210	53	470	1 UH	830	127	5.9 UJ	470
subsurface	Tributyltin ion	(ug/kg)	15	12	80	1 H	32000	6590	95	24000	1 UH	32000	5270	38 H	24000
subsurface	Tetrabutyltin	(ug/kg)	9	3	33.3	1 H	130	46.5	8.6	8.6	1 H	130	17.5	2 U	8.6
subsurface	Total solids	(%)	13	13	100	46.1	79.1	58.5	58.3	70.4	46.1	79.1	58.5	58.3	70.4
subsurface	Total organic carbon	(%)	4	4	100	0.06	2	1.27	1.4	1.6	0.06	2	1.27	1.4	1.6
subsurface	Gravel	(%)	4	4	100	0.24	1.4	0.77	0.64	0.8	0.24	1.4	0.77	0.64	0.8
subsurface	Sand	(%)	4	4	100	22.37	91.4	46.7	30.37	42.84	22.37	91.4	46.7	30.37	42.84
subsurface	Fines	(%)	4	4	100	7.8	77.39	52.5	55.76	68.99	7.8	77.39	52.5	55.76	68.99
subsurface	Silt	(%)	3	3	100	45.7	66.04	55.6	55.12	55.12	45.7	66.04	55.6	55.12	55.12
subsurface	Clay	(%)	3	3	100	10.06	13.87	11.8	11.35	11.35	10.06	13.87	11.8	11.35	11.35
subsurface	Aluminum	(mg/kg)	3	3	100	34500	40600	37300	36700	36700	34500	40600	37300	36700	36700
subsurface	Antimony	(mg/kg)	6	0	0						10 U	10 U	10	10 U	10 U
subsurface	Arsenic	(mg/kg)	15	11	73.3	3	35	11.5	5	32	1 U	35	9.33	4 U	32
subsurface	Cadmium	(mg/kg)	9	3	33.3	0.3	0.5	0.433	0.5	0.5	0.3	1 U	0.811	1 U	1 U
subsurface	Chromium	(mg/kg)	15	15	100	10	54	34.4	33.9	44	10	54	34.4	33.9	44
subsurface	Copper	(mg/kg)	9	9	100	12	218	64.6	45.1	79.9	12	218	64.6	45.1	79.9
subsurface	Lead	(mg/kg)	15	10	66.7	20	66	37.6	28	60	20 U	66	31.7	25	60
subsurface	Manganese	(mg/kg)	3	3	100	509	767	609	551	551	509	767	609	551	551

Table 2. Queried Sediment Chemistry Data.

Surface or Subsurface		Analyte	Units	Number of Samples	Number Detected	% Detected	Detected Concentrations					Detected and Nondetected Concentrations				
							Minimum	Maximum	Mean	Median	95th	Minimum	Maximum	Mean	Median	95th
subsurface		Mercury	(mg/kg)	3	3	100	0.07	0.32	0.167	0.11	0.11	0.07	0.32	0.167	0.11	0.11
subsurface		Nickel	(mg/kg)	9	9	100	18	87	35.2	29.2 J	34	18	87	35.2	29.2 J	34
subsurface		Selenium	(mg/kg)	3	3	100	9	12	10.7	11	11	9	12	10.7	11	11
subsurface		Silver	(mg/kg)	3	3	100	1.1	1.3	1.2	1.2	1.2	1.1	1.3	1.2	1.2	1.2
subsurface		Thallium	(mg/kg)	3	3	100	5	9	6.67	6	6	5	9	6.67	6	6
subsurface		Zinc	(mg/kg)	3	3	100	122	131	128	131	131	122	131	128	131	131
subsurface		Barium	(mg/kg)	3	3	100	161	184	171	168	168	161	184	171	168	168
subsurface		Beryllium	(mg/kg)	9	3	33.3	0.56	0.66	0.603	0.59	0.59	0.56	1 U	0.868	1 U	1 U
subsurface		Calcium	(mg/kg)	3	3	100	8450	8920	8680	8670	8670	8450	8920	8680	8670	8670
subsurface		Cobalt	(mg/kg)	3	3	100	16.7	18.7	17.4	16.9	16.9	16.7	18.7	17.4	16.9	16.9
subsurface		Iron	(mg/kg)	3	3	100	39200	42700	40500	39500	39500	39200	42700	40500	39500	39500
subsurface		Magnesium	(mg/kg)	3	3	100	6370	7300	6880	6980	6980	6370	7300	6880	6980	6980
subsurface		Potassium	(mg/kg)	3	3	100	1130	1280	1200	1180	1180	1130	1280	1200	1180	1180
subsurface		Sodium	(mg/kg)	3	3	100	948	1100	1040	1070	1070	948	1100	1040	1070	1070
subsurface		Titanium	(mg/kg)	3	3	100	1800	1920	1850	1840	1840	1800	1920	1850	1840	1840
subsurface		Vanadium	(mg/kg)	3	3	100	93.9	102	98.6	100	100	93.9	102	98.6	100	100
subsurface		2-Methylnaphthalene	(ug/kg)	6	5	83.3	22	180	69	41	62 GH	19 U	180	60.7	40	62 GH
subsurface		Acenaphthene	(ug/kg)	6	4	66.7	26	120	79	79	91 GH	5 U	120	56.7	26	91 GH
subsurface		Acenaphthylene	(ug/kg)	6	4	66.7	31 N	74	51.5	40	61 GH	5 U	74	38.3	31 N	61 GH
subsurface		Anthracene	(ug/kg)	6	5	83.3	22	150	85.8	57	144 GH	5 U	150	72.3	56	144 GH
subsurface		Fluorene	(ug/kg)	6	5	83.3	20	190	85	61	112 GH	5 U	190	71.7	42	112 GH
subsurface		Naphthalene	(ug/kg)	6	6	100	8	150	99.3	130	147 GH	8	150	99.3	130	147 GH
subsurface		Phenanthrene	(ug/kg)	6	5	83.3	120	820	448	360	710 GH	5 U	820	374	231	710 GH
subsurface		Low Molecular Weight PAH	(ug/kg)	6	6	100	8 A	1420 A	697	580 A	1265 A	8 A	1420 A	697	580 A	1265 A
subsurface		Dibenz(a,h)anthracene	(ug/kg)	6	4	66.7	11	46 GH	32	31	40	5 U	46 GH	25.3	19 U	40
subsurface		Benz(a)anthracene	(ug/kg)	6	5	83.3	60	343 GH	176	180	230	5 U	343 GH	148	67	230
subsurface		Benzo(a)pyrene	(ug/kg)	6	5	83.3	67	190	137	160 GH	180	5 U	190	115	86	180
subsurface		Benzo(b)fluoranthene	(ug/kg)	6	5	83.3	51	196 GH	127	160	160	5 U	196 GH	107	68	160
subsurface		Benzo(g,h,i)perylene	(ug/kg)	6	5	83.3	45	140	98.6	103 GH	130	5 U	140	83	75	130
subsurface		Benzo(k)fluoranthene	(ug/kg)	6	5	83.3	58	170	109	110	134 GH	5 U	170	91.8	74	134 GH
subsurface		Chrysene	(ug/kg)	6	5	83.3	93	360 GH	224	230	340	5 U	360 GH	187	95	340
subsurface		Fluoranthene	(ug/kg)	6	5	83.3	180	1100 GH	486	440	490	5 U	1100 GH	406	218	490
subsurface		Indeno(1,2,3-cd)pyrene	(ug/kg)	6	5	83.3	39	159 GH	91.6	95	100	5 U	159 GH	77.2	65	100
subsurface		Pyrene	(ug/kg)	6	5	83.3	170	990 GH	560	560	790	5 U	990 GH	468	292	790
subsurface		Benzo(b+k)fluoranthene	(ug/kg)	6	5	83.3	109 A	330 A	236	270 A	330 A	5 UA	330 A	198	142 A	330 A
subsurface		High Molecular Weight PAH	(ug/kg)	6	5	83.3	796 A	3591 A	2030	2235 A	2531 A	5 UA	3591 A	1700	1018 A	2531 A
subsurface		Polycyclic Aromatic Hydrocarbons	(ug/kg)	6	6	100	8 A	4856 A	2390	1598 A	3951 A	8 A	4856 A	2390	1598 A	3951 A
subsurface		4,4'-DDD	(ug/kg)	2	2	100	2.2 J	7.6	4.9	2.2 J	2.2 J	2.2 J	7.6	4.9	2.2 J	2.2 J
subsurface		4,4'-DDE	(ug/kg)	2	1	50	2 J	2 J	2	2 J	2 J	2 J	3.1 UI	2.55	2 J	2 J
subsurface		4,4'-DDT	(ug/kg)	2	0	0						2.9 UIJ	5.6 UIJ	4.25	2.9 UIJ	2.9 UIJ
subsurface		Total of 3 isomers: pp-DDT,-DDD,-DDE	(ug/kg)	2	2	100	4.2 A	7.6 A	5.9	4.2 A	4.2 A	4.2 A	7.6 A	5.9	4.2 A	4.2 A
subsurface		Aldrin	(ug/kg)	2	0	0						0.94 U	0.97 UJ	0.955	0.94 U	0.94 U
subsurface		alpha-Hexachlorocyclohexane	(ug/kg)	2	0	0						0.94 U	0.97 UJ	0.955	0.94 U	0.94 U
subsurface		beta-Hexachlorocyclohexane	(ug/kg)	2	0	0						0.94 U	0.97 UJ	0.955	0.94 U	0.94 U
subsurface		delta-Hexachlorocyclohexane	(ug/kg)	2	0	0						0.94 UJ	0.97 UJ	0.955	0.94 UJ	0.94 UJ
subsurface		gamma-Hexachlorocyclohexane	(ug/kg)	2	0	0						0.94 U	0.97 UJ	0.955	0.94 U	0.94 U
subsurface		cis-Chlordane	(ug/kg)	2	0	0						0.94 U	0.97 UJ	0.955	0.94 U	0.94 U
subsurface		Dieldrin	(ug/kg)	2	0	0						1.9 U	1.9 UJ	1.9	1.9 U	1.9 U
subsurface		alpha-Endosulfan	(ug/kg)	2	0	0						0.94 U	0.97 UJ	0.955	0.94 U	0.94 U

Table 2. Queried Sediment Chemistry Data.

Surface or Subsurface		Analyte	Units	Number of Samples	Number Detected	% Detected	Detected Concentrations				Detected and Nondetected Concentrations					
							Minimum	Maximum	Mean	Median	95th	Minimum	Maximum	Mean	Median	95th
subsurface	beta-Endosulfan	(ug/kg)	2	0	0							1.9 U	1.9 UJ	1.9	1.9 U	1.9 U
subsurface	Endosulfan sulfate	(ug/kg)	2	0	0							2.4 UIJ	3 UI	2.7	2.4 UIJ	2.4 UIJ
subsurface	Endrin	(ug/kg)	2	0	0							1.9 UJ	5.2 UI	3.55	1.9 UJ	1.9 UJ
subsurface	Endrin aldehyde	(ug/kg)	2	0	0							1.9 UJ	4.8 UI	3.35	1.9 UJ	1.9 UJ
subsurface	Endrin ketone	(ug/kg)	2	0	0							1.9 UJ	8.9 UI	5.4	1.9 UJ	1.9 UJ
subsurface	Heptachlor	(ug/kg)	2	0	0							0.94 U	0.97 UJ	0.955	0.94 U	0.94 U
subsurface	Heptachlor epoxide	(ug/kg)	2	0	0							0.94 U	0.97 UJ	0.955	0.94 U	0.94 U
subsurface	Methoxychlor	(ug/kg)	2	0	0							9.4 U	9.7 UJ	9.55	9.4 U	9.4 U
subsurface	Toxaphene	(ug/kg)	2	0	0							94 U	97 UJ	95.5	94 U	94 U
subsurface	gamma-Chlordane	(ug/kg)	2	0	0							0.97 UJ	1.6 UI	1.29	0.97 UJ	0.97 UJ
subsurface	2,4,5-Trichlorophenol	(ug/kg)	3	0	0							94 U	98 U	96.3	97 U	97 U
subsurface	2,4,6-Trichlorophenol	(ug/kg)	3	0	0							94 U	98 U	96.3	97 U	97 U
subsurface	2,4-Dichlorophenol	(ug/kg)	3	0	0							56 U	59 U	57.7	58 U	58 U
subsurface	2,4-Dimethylphenol	(ug/kg)	3	0	0							19 U	20 U	19.3	19 U	19 U
subsurface	2,4-Dinitrophenol	(ug/kg)	3	0	0							190 UJ	200 UJ	193	190 UJ	190 UJ
subsurface	2-Chlorophenol	(ug/kg)	3	0	0							19 U	20 U	19.3	19 U	19 U
subsurface	2-Methylphenol	(ug/kg)	3	0	0							19 U	20 U	19.3	19 U	19 U
subsurface	2-Nitrophenol	(ug/kg)	3	0	0							94 U	98 U	96.3	97 U	97 U
subsurface	4,6-Dinitro-2-methylphenol	(ug/kg)	3	0	0							190 UJ	200 UJ	193	190 UJ	190 UJ
subsurface	4-Chloro-3-methylphenol	(ug/kg)	3	0	0							38 U	39 U	38.7	39 U	39 U
subsurface	4-Methylphenol	(ug/kg)	3	3	100	52	210	137	150	150		52	210	137	150	150
subsurface	4-Nitrophenol	(ug/kg)	3	0	0							94 U	98 U	96.3	97 U	97 U
subsurface	Pentachlorophenol	(ug/kg)	3	0	0							94 U	98 U	96.3	97 U	97 U
subsurface	Phenol	(ug/kg)	3	0	0							19 U	20 U	19.3	19 U	19 U
subsurface	Dimethyl phthalate	(ug/kg)	3	0	0							19 U	20 U	19.3	19 U	19 U
subsurface	Diethyl phthalate	(ug/kg)	3	0	0							19 U	20 U	19.3	19 U	19 U
subsurface	Dibutyl phthalate	(ug/kg)	3	0	0							19 U	20 U	19.3	19 U	19 U
subsurface	Butylbenzyl phthalate	(ug/kg)	3	0	0							19 U	20 U	19.3	19 U	19 U
subsurface	Di-n-octyl phthalate	(ug/kg)	3	0	0							19 U	20 U	19.3	19 U	19 U
subsurface	Bis(2-ethylhexyl) phthalate	(ug/kg)	3	1	33.3	260	260	260	260	260		31 U	260	121	73 U	73 U
subsurface	Bis(2-chloro-1-methylethyl) ether	(ug/kg)	3	0	0							19 U	20 U	19.3	19 U	19 U
subsurface	2,4-Dinitrotoluene	(ug/kg)	3	0	0							94 U	98 U	96.3	97 U	97 U
subsurface	2,6-Dinitrotoluene	(ug/kg)	3	0	0							94 U	98 U	96.3	97 U	97 U
subsurface	2-Chloronaphthalene	(ug/kg)	3	0	0							19 U	20 U	19.3	19 U	19 U
subsurface	2-Nitroaniline	(ug/kg)	3	0	0							94 U	98 U	96.3	97 U	97 U
subsurface	3,3'-Dichlorobenzidine	(ug/kg)	3	0	0							94 U	98 U	96.3	97 U	97 U
subsurface	3-Nitroaniline	(ug/kg)	3	0	0							110 U	120 U	117	120 U	120 U
subsurface	4-Bromophenyl phenyl ether	(ug/kg)	3	0	0							19 U	20 U	19.3	19 U	19 U
subsurface	4-Chloroaniline	(ug/kg)	3	0	0							56 U	59 U	57.7	58 U	58 U
subsurface	4-Chlorophenyl phenyl ether	(ug/kg)	3	0	0							19 U	20 U	19.3	19 U	19 U
subsurface	4-Nitroaniline	(ug/kg)	3	0	0							94 U	98 U	96.3	97 U	97 U
subsurface	Benzoic acid	(ug/kg)	3	0	0							190 U	200 U	193	190 U	190 U
subsurface	Benzyl alcohol	(ug/kg)	3	0	0							19 U	20 U	19.3	19 U	19 U
subsurface	Bis(2-chloroethoxy) methane	(ug/kg)	3	0	0							19 U	20 U	19.3	19 U	19 U
subsurface	Bis(2-chloroethyl) ether	(ug/kg)	3	0	0							38 U	39 U	38.7	39 U	39 U
subsurface	Carbazole	(ug/kg)	2	0	0							19 U	19 U	19	19 U	19 U
subsurface	Dibenzofuran	(ug/kg)	6	3	50	16	52 GH	30.7	24	24		5 U	52 GH	22.7	19 U	24
subsurface	Hexachlorobenzene	(ug/kg)	3	0	0							19 U	20 U	19.3	19 U	19 U
subsurface	Hexachlorobutadiene	(ug/kg)	3	0	0							19 U	20 U	19.3	19 U	19 U

Table 2. Queried Sediment Chemistry Data.

Surface or Subsurface	Analyte	Units	Number of Samples	Number Detected	% Detected	Detected Concentrations					Detected and Nondetected Concentrations				
						Minimum	Maximum	Mean	Median	95th	Minimum	Maximum	Mean	Median	95th
subsurface	Hexachlorocyclopentadiene	(ug/kg)	3	0	0						94 U	98 U	96.3	97 U	97 U
subsurface	Hexachloroethane	(ug/kg)	3	0	0						19 U	20 U	19.3	19 U	19 U
subsurface	Isophorone	(ug/kg)	3	0	0						19 U	20 U	19.3	19 U	19 U
subsurface	Nitrobenzene	(ug/kg)	3	0	0						19 U	20 U	19.3	19 U	19 U
subsurface	N-Nitrosodipropylamine	(ug/kg)	3	0	0						38 U	39 U	38.7	39 U	39 U
subsurface	N-Nitrosodiphenylamine	(ug/kg)	3	0	0						19 U	20 U	19.3	19 U	19 U
subsurface	1,2-Dichlorobenzene	(ug/kg)	3	0	0						19 U	20 U	19.3	19 U	19 U
subsurface	1,3-Dichlorobenzene	(ug/kg)	3	0	0						19 U	20 U	19.3	19 U	19 U
subsurface	1,4-Dichlorobenzene	(ug/kg)	3	0	0						19 U	20 U	19.3	19 U	19 U
subsurface	1,2,4-Trichlorobenzene	(ug/kg)	3	0	0						19 U	20 U	19.3	19 U	19 U

SUPPLEMENTAL FIGURES

Exhibit “A” Waterway Lease Application Form

Figure 4. Historical Site Use and Potential Environmental Concerns (MFA 2003b)

Figure 4-1. Location of Geologic Cross Sections (MFA 2002)

Figure 4-2. Cross Section A-A' (MFA 2002)

Figure 4-3. Cross Section B-B' (MFA 2002)

Figure 4-4. Cross Section C-C' (MFA 2002)

Figure 4-5. Cross Sections D-D' and E-E' (MFA 2002)

Figure 6. Soil Volumes Exceeding Cleanup Level Concentrations (MFA 2003b)

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Waterway Lease Application Form

COPY
DIVISION OF STATE LANDS
RECEIVED

AUG -3 P 1:33

IN IE 18

AGENCY WILL ASSIGN NUMBER

Oregon Division of State Lands Application No. **ML-15335**

SEND ONE SIGNED COPY OF YOUR APPLICATION TO: App# 10148

State of Oregon
Division of State Lands
775 Summer Street NE
Salem, OR 97301-1279
503-378-3805

① Applicant Name and Address Triangle Park, LLC
3121 SW Moody Avenue
Portland, Oregon 97201
Business Phone #
Home Phone# 503-228-8691
FAX # 503-228-6750

○ Co-Applicant
⊗ Authorized Agent Steven L. Shain
○ Contractor 3121 SW Moody Avenue
Name and Address Portland, Oregon 97201
Business Phone # 503-228-8691
Home Phone #
FAX # 503-228-6750

Riparian Property Owner
(vested title); if different
than applicant
Name and Address
Business Phone #
Home Phone #
FAX #

② PROJECT LOCATION

Street, Road or other descriptive location		Legal Description			
828 North Van Houten Place Portland, Oregon		Quarter	Section	Township	Range
			18	1N	1E
In or Near (City or Town)	County	Tax Map #	Tax Lot #		
Portland	Multnomah		TL 100		
Waterway	River Mile	County Property Tax Account Number			
Willamette River	7.5	R315775			

Is consent to enter property granted by the Corps and the Division of State Lands? ☒ Yes ☐ No

③ PROPOSED PROJECT INFORMATION

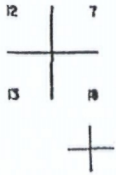
Activity Type (Check all that apply):
1. ☐ Log rafts/log storage areas
2. ☐ Commercial marina and floating home moorages
3. ☐ Noncommercial marina and owner-oriented floating home moorages
4. ☒ Marine industrial; marine services; fish processing facilities
5. ☐ Non-marine uses (restaurant, retail sales, offices, motel, residences, etc.)
Historical vessel moorage
Area requested (length x width)
99,027 square feet

Are you aware of any Endangered Species on the project site? ☐ Yes ☒ No
Are you aware of any Cultural Resources on the project site? ☐ Yes ☒ No
Is the project site near a Wild and Scenic River? ☐ Yes ☒ No
If yes, please explain in the project description (on page 2, block 4)

PREPARED FOR
ANY PURPOSE ONLY

SECTION 18 T.1N. R.1E. W.1A
SEE MAP MULTNOMAH COUNTY
IN IE 18B SEE MAP IN IE T

IN
&
PORT



S. COR.
WILLIAM COPLES
D.L.C. 48

SEE DETAIL MAP NO. 1
001

SEE MAP
IN IE 18A

SEE MAP
IN IE 18A

SEE MAP
IN IE 18A

SEE MAP IN IW 13

SEE MAP
IN IE 18B

WILLAMETTE
RIVER

WILLAMETTE
RIVER

WILLAMETTE
RIVER

SEE MAP IN IE 17S

SEE MAP

E. COR.
WILTON DONE
D.L.C. 59

SEE MAP
IN IW 13

IN IE 18C

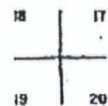
N. COR.
GEORGE
KITTRIDGE
D.L.C. 56

RIVER

SEE MAP
IN IE 18D

SEE MAP IN IE 17

700,000

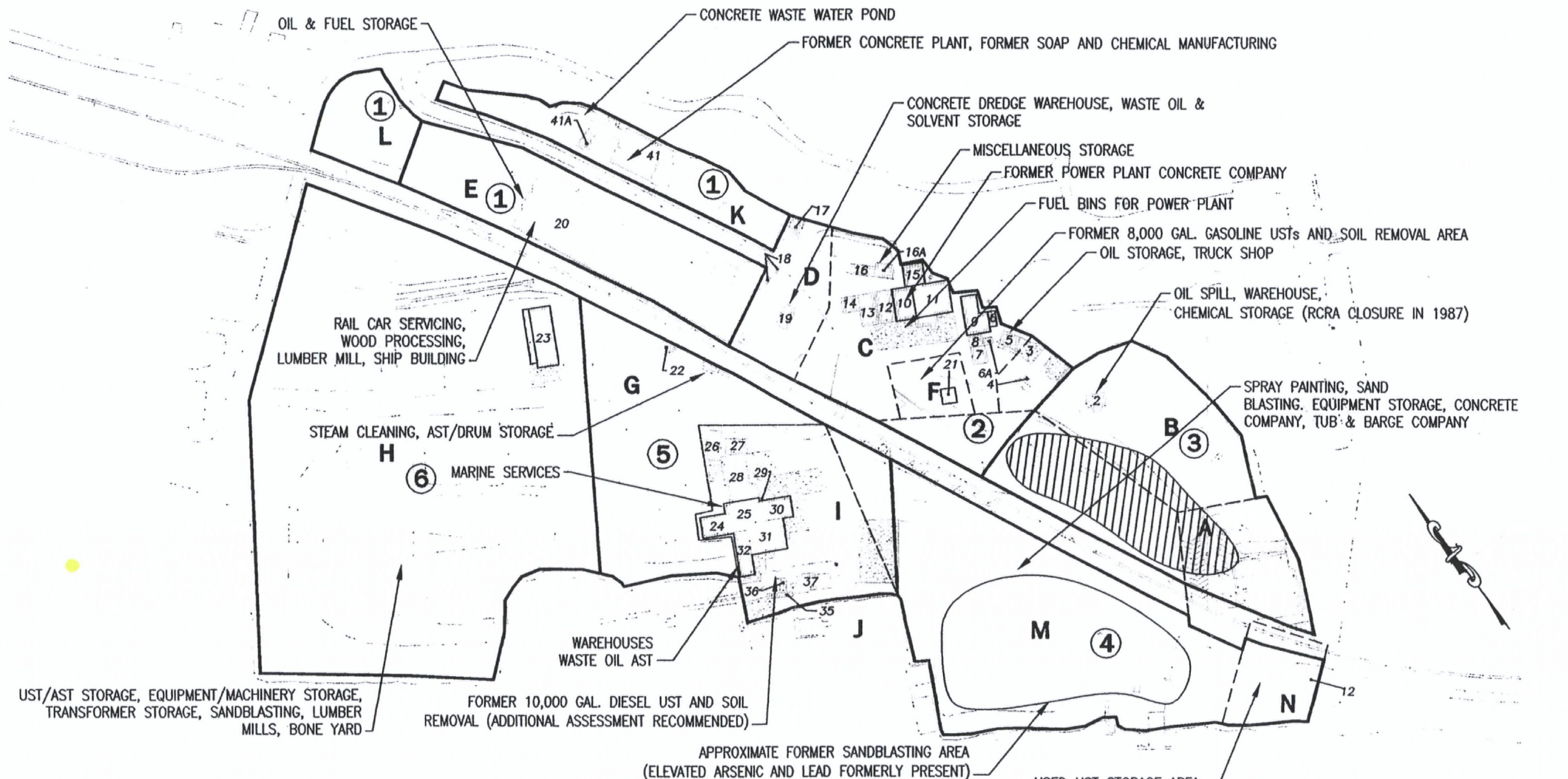


SEE MAP IN IE 18B

SEE MAP IN IE 18A

IN
&
PORT

Exhibit "A"



LEGEND:

36 BUILDING NUMBER

EXPOSURE AREA DESIGNATION (BASED ON FUTURE ANTICIPATED LAND USE)

HISTORICAL AREA DESIGNATION (BASED ON PAST USE)

6 EXPOSURE AREAS

AREA OF VISUAL PETROLEUM HYDROCARBON CONTAMINATION IN SOIL AND FREE PRODUCT IN GROUNDWATER

0 200 400
SCALE IN FEET

Vancouver: (360) 694-2691

Edmonds: (425) 744-1489

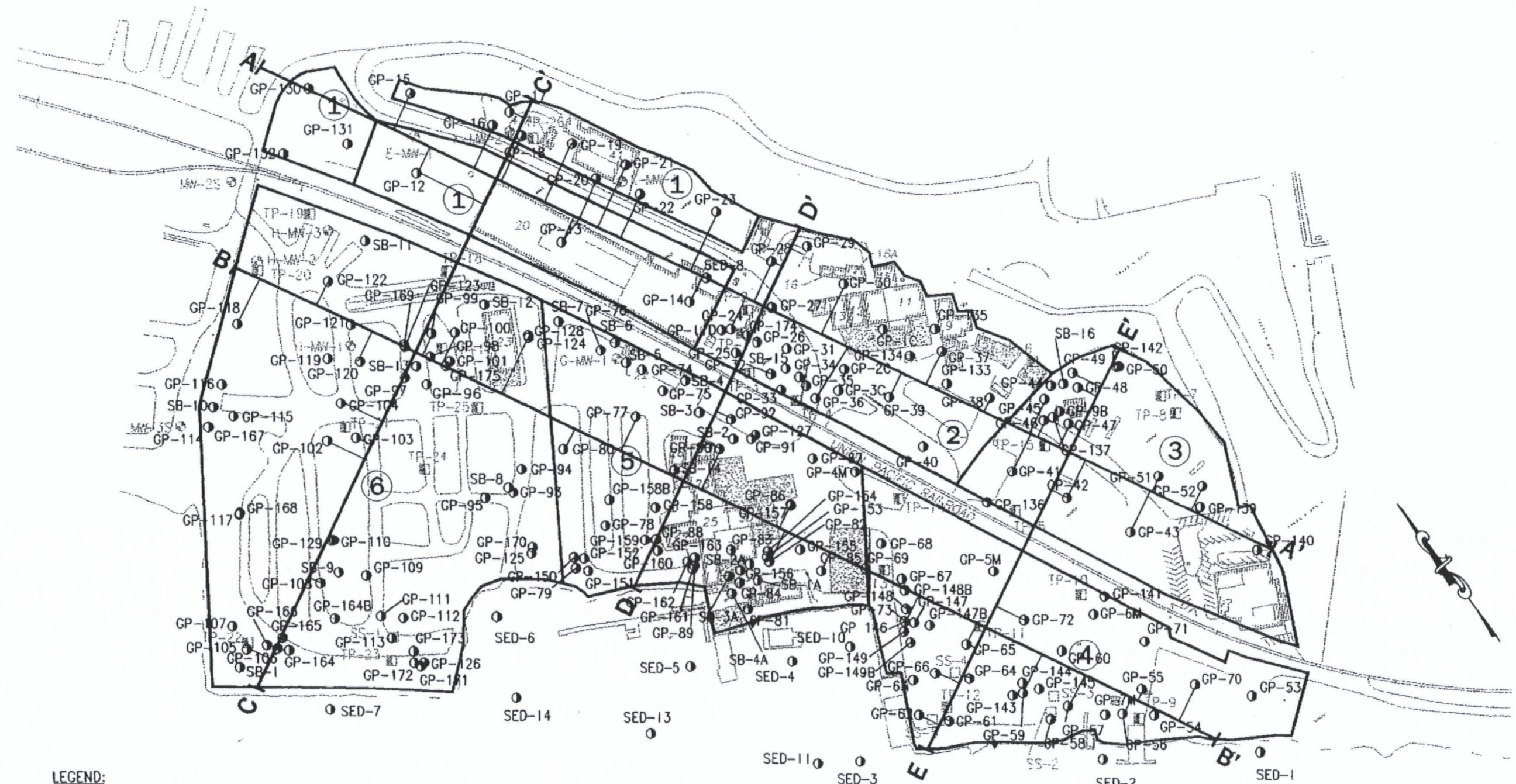
Portland: (971) 544-2139

**MAUL
FOSTER
ALONGI**

DATE 02/21/03
DWN. JLN
APPR. ☒
REVIS. ☒
PROJECT NO.
8016.01.05

Figure 4
TRIANGLE PARK, LLC
PORTLAND, OREGON

**HISTORICAL SITE USE AND POTENTIAL
ENVIRONMENTAL CONCERNS**



LEGEND:

- GEOPROBE BORING LOCATIONS
- SURFACE SAMPLE LOCATIONS
- TEST PIT LOCATIONS
- MONITORING WELL LOCATIONS
- 36 BUILDING NUMBER

EXPOSURE AREA DESIGNATION (BASED ON FUTURE ANTICIPATED LAND USE)

A — CROSS SECTION LOCATION

● SED-16 ● SED-15

SED-12 ●

● SED-9

WILLAMETTE RIVER

0 200 400
SCALE IN FEET

Suite B
7223 NE Hazel Dell Ave.
Vancouver, WA 98665

P 360.694.2691
F 360.906.1958

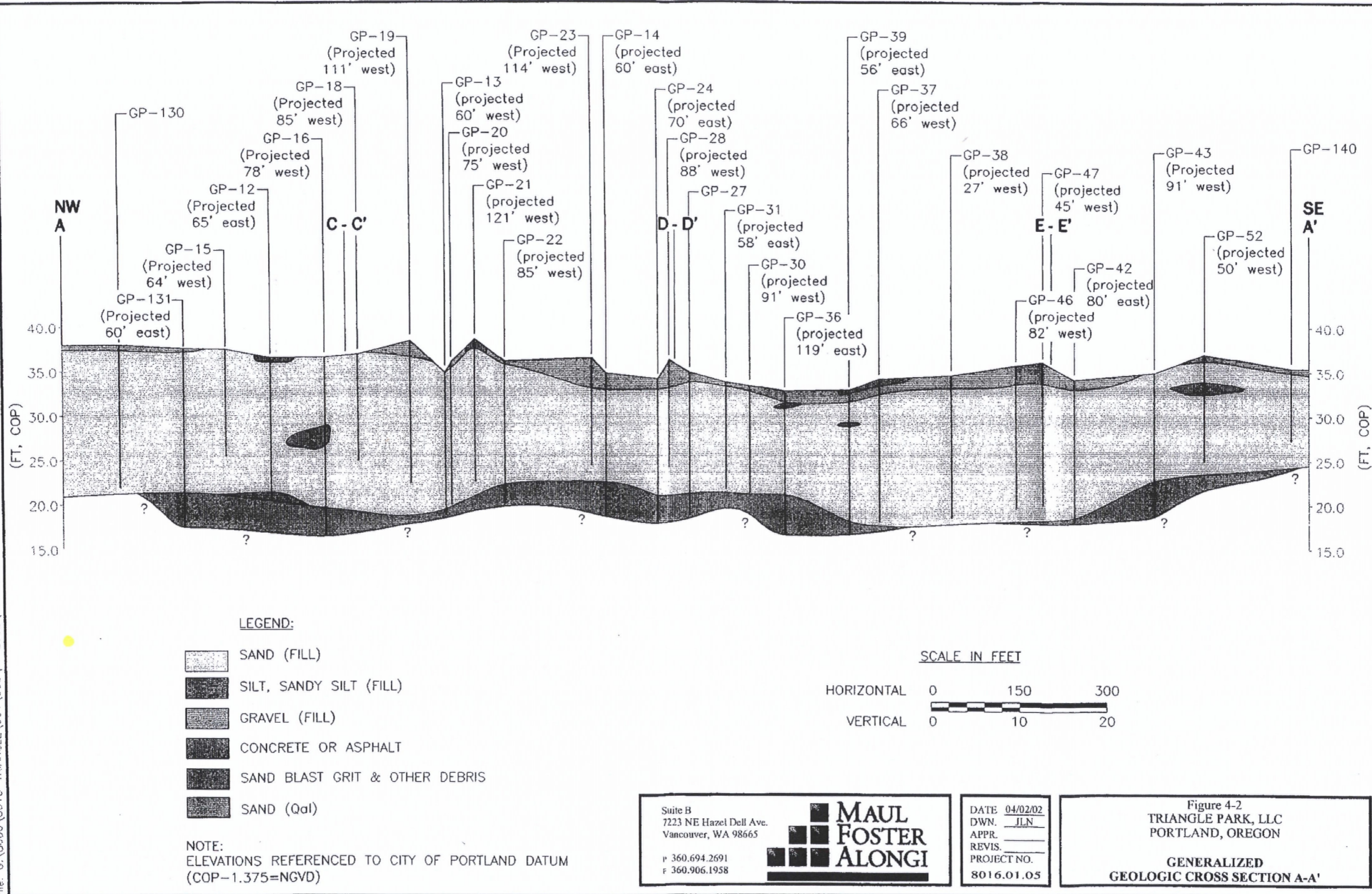
**MAUL
FOSTER
ALONGI**

DATE 05/21/02
DWN. AJY
APPR. _____
REVIS. _____
PROJECT NO.
8016.01.05

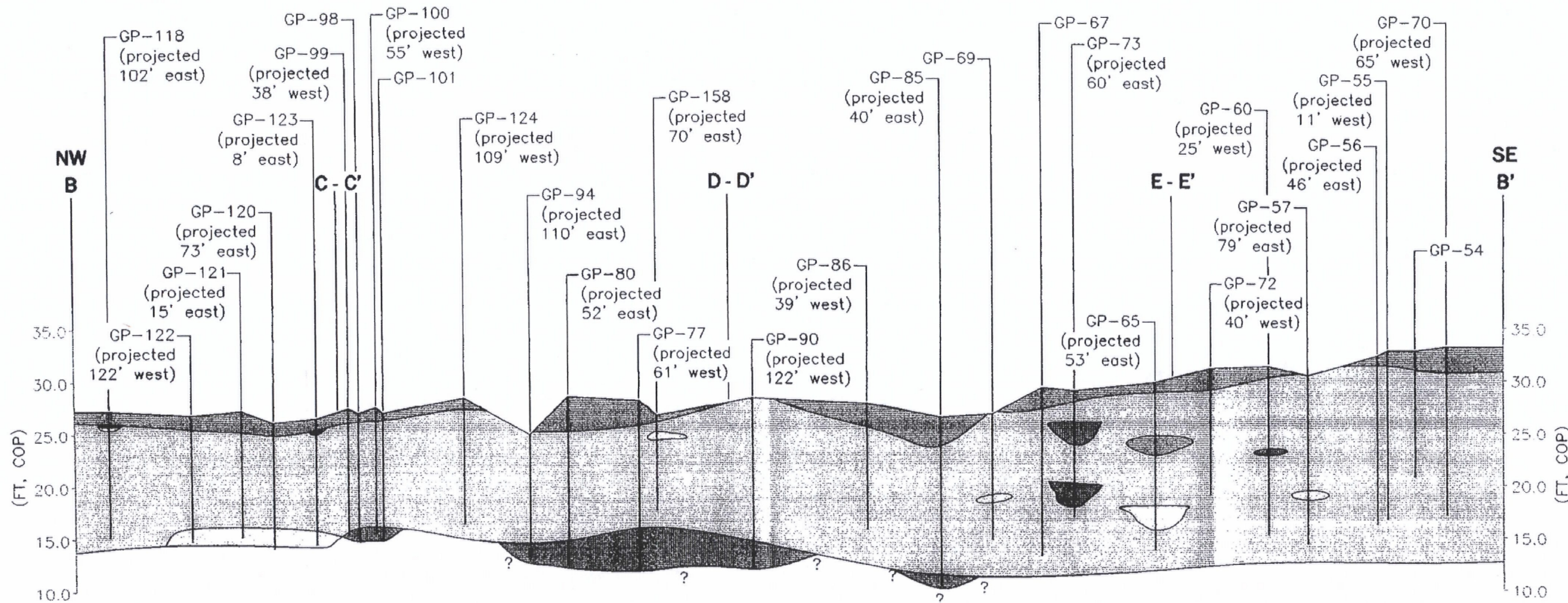
Figure 4-1
TRIANGLE PARK, LLC
PORTLAND, OREGON

LOCATION OF GEOLOGIC CROSS SECTIONS

File: G:\8000\8016-TRIANGLE\001\005\RI-2002\001-CROSS SECTIONS.DWG Last edited: JUN. 07, 2002 @ 2:21 p.m. by: JNESS Xrefs: sections xref 50%Color



File: G:\8000\8016-TRIANGLE\001\005\RI-2002\001-CROSS SECTIONS.DWG Last edited: JUN. 07. 2002 @ 2:21 p.m. by: JNESS Xrefs: sections xref 50%Color



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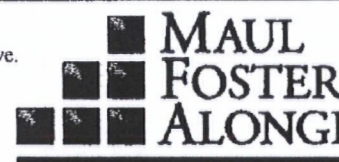
- SAND (FILL)
- SILT, SANDY SILT (FILL)
- GRAVEL (FILL)
- CONCRETE OR ASPHALT (FILL)
- SAND BLAST GRIT & OTHER DEBRIS
- SAND (Qal)
- WOODY DEBRIS

NOTE:
 ELEVATIONS REFERENCED TO CITY OF PORTLAND DATUM
 (COP-1.375=NGVD)

SCALE IN FEET



Suite B
 7223 NE Hazel Dell Ave.
 Vancouver, WA 98665

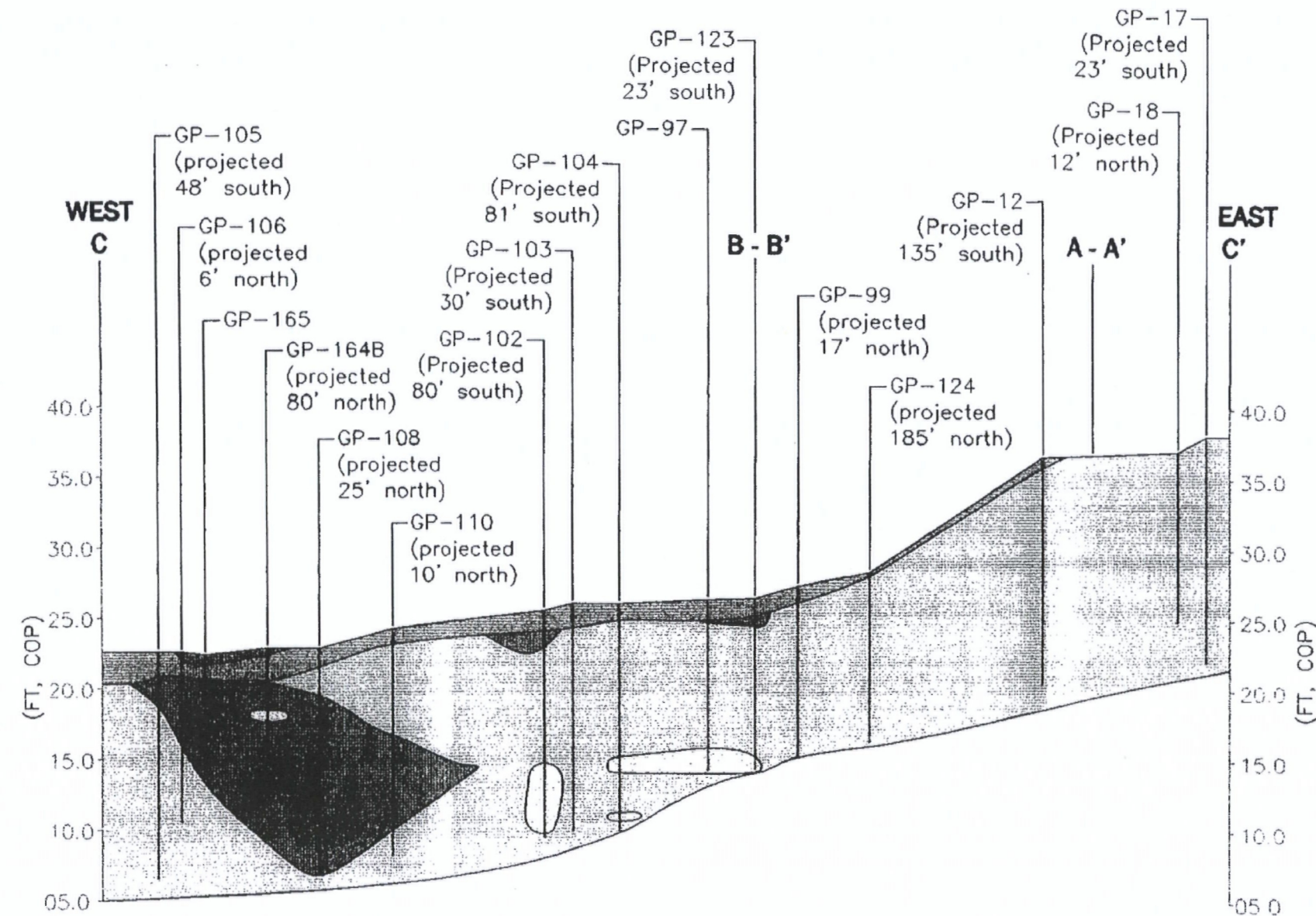


P 360.694.2691
 F 360.906.1958

DATE 04/02/02
 DWN. JLN
 APPR. _____
 REVIS. _____
 PROJECT NO.
 8016.01.05

Figure 4-3
 TRIANGLE PARK, LLC
 PORTLAND, OREGON

**GENERALIZED
 GEOLOGIC CROSS SECTION B-B'**



LEGEND:

- SAND (FILL)
- SILT, SANDY SILT (FILL)
- GRAVEL (FILL)
- CONCRETE OR ASPHALT
- WOODY DEBRIS

NOTE:
ELEVATIONS REFERENCED TO CITY OF PORTLAND DATUM
(COP-1.375=NGVD)

SCALE IN FEET



Suite B
7223 NE Hazel Dell Ave.
Vancouver, WA 98665

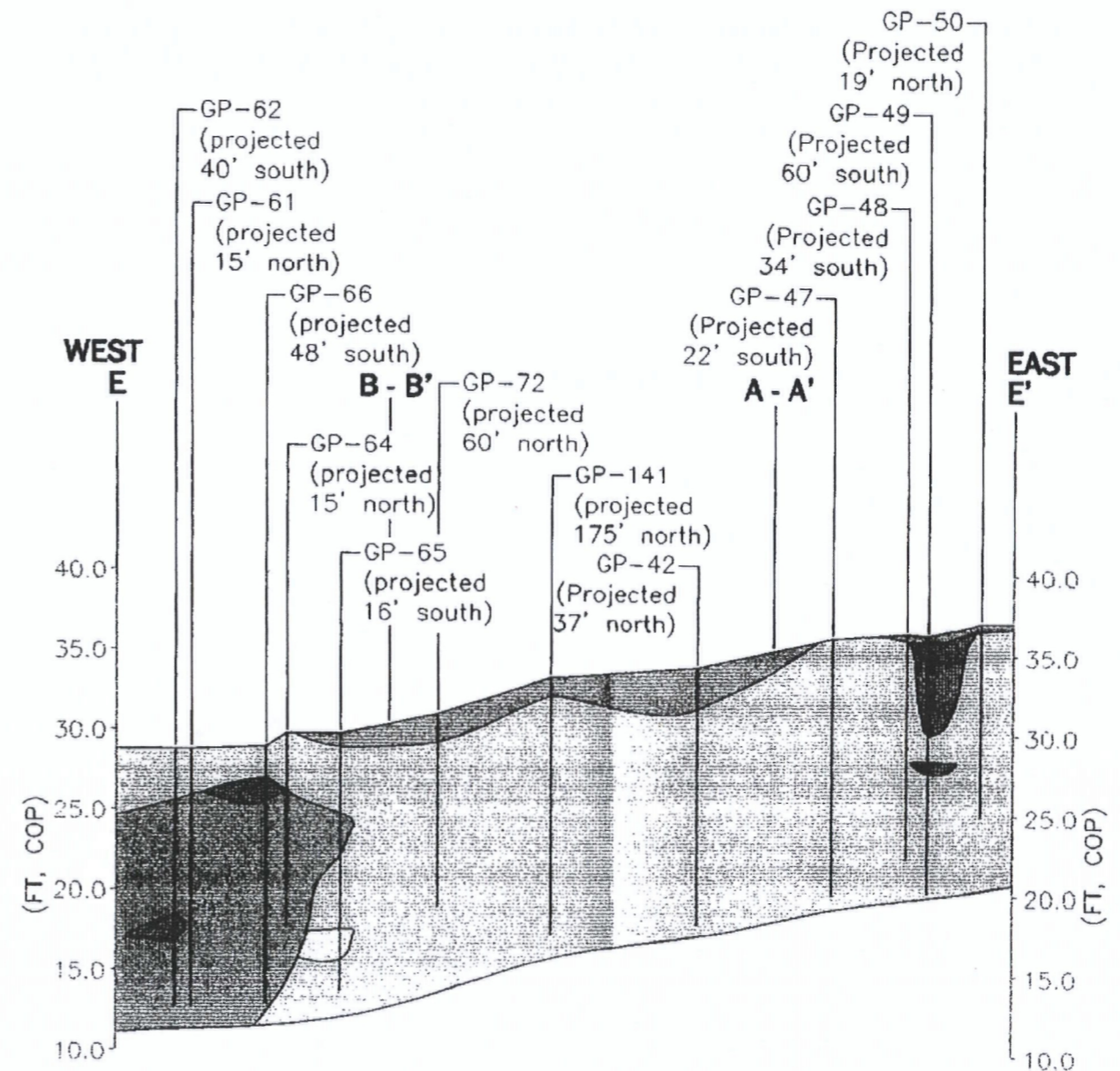
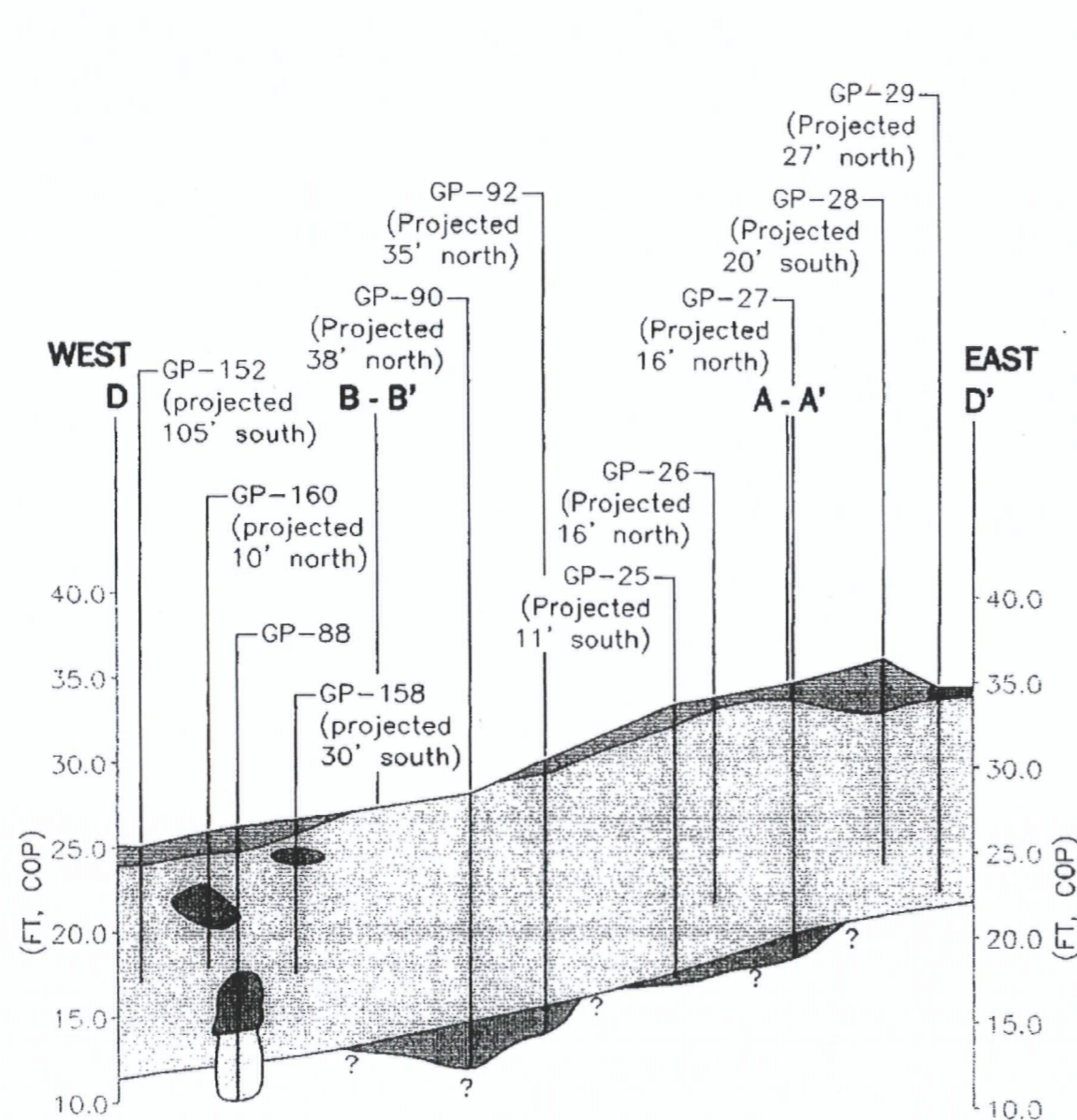
P 360.694.2691
F 360.906.1958



DATE 04/02/02
DWN. JLN
APPR. _____
REVIS. _____
PROJECT NO.
8016.01.05

Figure 4-4
TRIANGLE PARK, LLC
PORTLAND, OREGON

**GENERALIZED
GEOLOGIC CROSS SECTION C-C'**



SCALE IN FEET



Suite B
 7223 NE Hazel Dell Ave.
 Vancouver, WA 98665

P 360.694.2691
 F 360.906.1958



DATE 04/02/02
 DWN. JLN
 APPR. _____
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 PROJECT NO.
 8016.01.05

Figure 4-5
 TRIANGLE PARK, LLC
 PORTLAND, OREGON

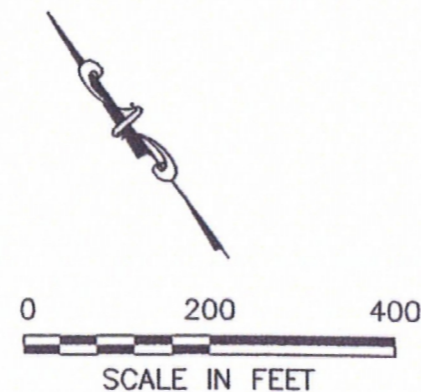
**GENERALIZED
 GEOLOGIC CROSS SECTIONS D-D' AND E-E'**

VERTICAL EXTENT (FEET BELOW GROUND SURFACE)

- 0-3'
- 3.1-5'
- 5.1-10'
- 10.1-15'

(VOLUME=103,800 FT³)
(VOLUME=3,850 YD³)

⑤ EXPOSURE AREAS



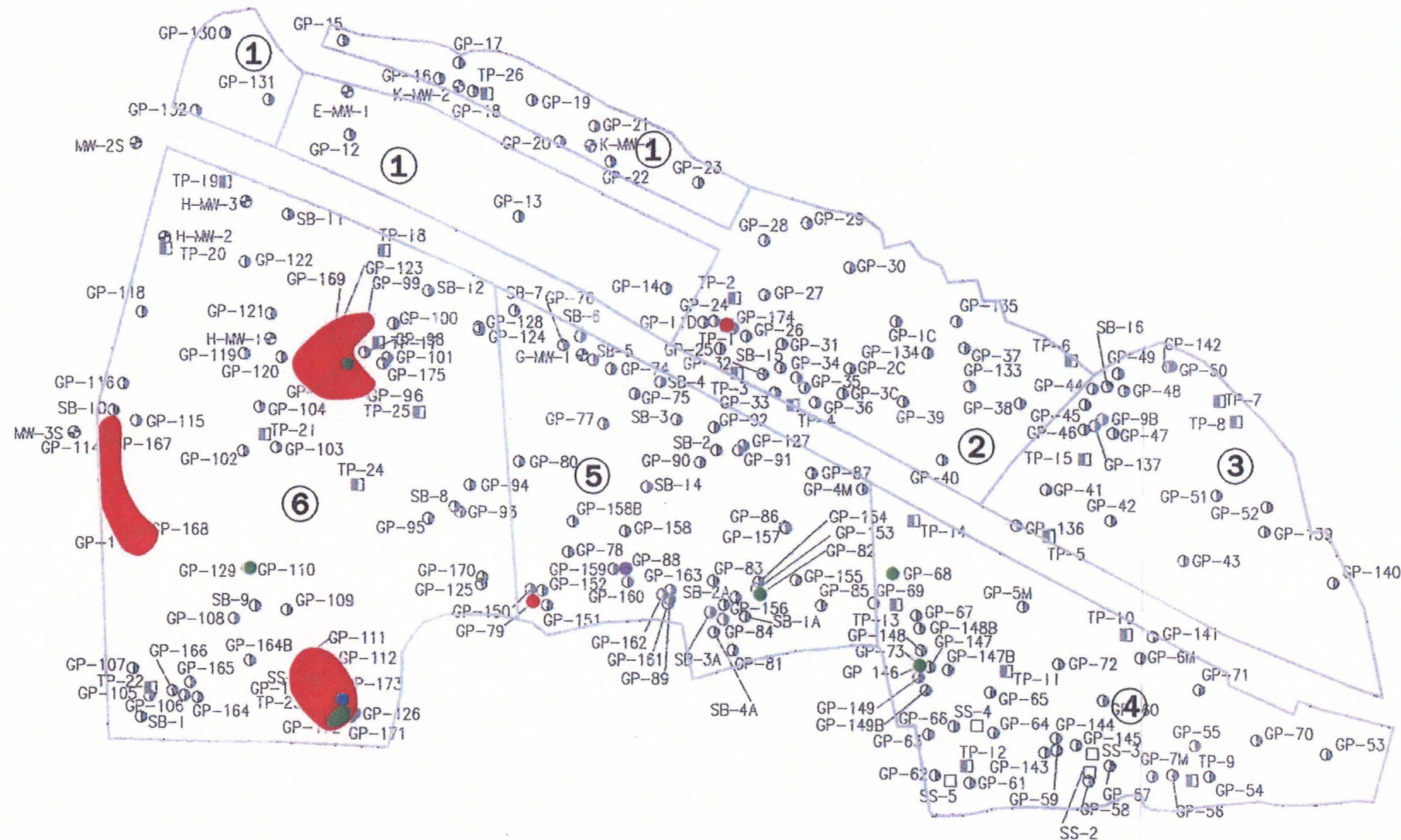
Vancouver: (360) 694-2691
Edmonds: (425) 744-1489
Portland: (971) 544-2139



DATE 02/20/03
DWN. JLN
APPR. [Signature]
REVIS.
PROJECT NO.
8016.01.05

Figure 6
TRIANGLE PARK, LLC
PORTLAND, OREGON

SOIL VOLUMES EXCEEDING
CLEANUP LEVEL CONCENTRATIONS



SUPPLEMENTAL TABLES

Table 5. Proposed Soil Cleanup and Hot Spot Levels (MFA 2003b)

Table 6. Soil Volumes Exceeding Cleanup Level Concentrations (MFA 2003b)

Table 7. Soil Volumes Exceeding Hot Spot Concentrations (MFA 2003b)

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This document is currently under review by US EPA and its federal, state, and tribal partners, and is subject to change in whole or in part.

Table 5
Proposed Soil Cleanup and Hot Spot Levels
Triangle Park, L.L.C.
Portland, Oregon

Chemicals	Cleanup Level Based on Human Health ¹ (mg/kg)	Hot Spot Levels Based on Indust. PRGs ² (mg/kg)	Cleanup Level Based on SLV for Bird Populations ³ (mg/kg)	Hot Spot Levels Related to Ecological Cleanup Levels ⁴ (mg/kg)	Areas of Concern in Which Exceedances Occur ⁵
Benz(a)anthracene	2	210	NA	NA	AOC 5
Benzo(a)pyrene	0.2	21	NA	NA	AOC 1, AOC 5, AOC 6
Benzo(b)fluoranthene	2	210	NA	NA	AOC 5, AOC 6
Dibenz(a,h)anthracene	0.2	21	NA	NA	AOC 5, AOC 6
Indeno(1,2,3-c,d)pyrene	2	210	NA	NA	AOC 5
Arsenic	6 a	160	NA	NA	AOC 4, AOC 5, AOC 6
Lead	750 b	7,500	80	800	SEE EXPLANATION FOOTNOTE
Aroclor 1260	1	74	NA	NA	AOC 4, AOC 5

NOTES:

Bold font indicates most stringent cleanup level or hot spot concentration. These are the final soil cleanup levels.

PRG: Preliminary remediation goals from USEPA Region 9 PRG Tables, October 1, 2002.

SLV: Ecological screening level value.

NA: Not applicable.

a: The Clark County, Washington 90th percentile background concentration of 6 mg/kg arsenic will be used as the site-specific cleanup level (Washington Department of Ecology, Publication # 94-115, October 1994).

b: Cleanup level is a USEPA preliminary remediation goal (PRG) concentration for lead in an industrial setting, and is based on the risk of uptake of lead into the blood system.

1: Cleanup levels based on human health risk to occupational workers are presented here.

2: As allowed by the Oregon Department of Environmental Quality, hot spot levels for carcinogens are set at 100 times the USEPA Region 9 PRG for industrial soil. The hot spot level for lead, which is a noncarcinogen, was set at 10 times the industrial soil PRG.

3: Due to the ruderal nature of the site, only SLVs protective of birds and mammals are considered relevant. In all cases, the SLV that is protective of birds was more stringent than the SLV that is protective of mammals. Thus, only the SLVs protective of birds are presented. Lead was the only chemical of potential ecological concern (CEPC) identified for terrestrial bird populations. The cleanup level protective of bird populations was set at 5 times the DEQ SLV protective of individual birds (16 mg/kg lead).

4: The hot spot level for terrestrial bird populations was set at 10 times the cleanup level.

5: Please refer to related list for specific descriptions of sample locations where exceedances occur.

EXPLANATION: If soil at one sample location, TP-1 in AOC 2, is removed to 5 feet below ground surface, all other lead detections on site will result in human and ecological risk that does not exceed DEQ-acceptable levels.

Table 6
Soil Volumes Exceeding Cleanup Level Concentrations
Triangle Park LLC
Portland, Oregon

COC	Cleanup Level (mg/kg)	Maximum detection ^a (mg/kg)	Number of Cleanup Level Exceedances ^a	Cleanup Level Exceedance Locations ^a (value;depth)
Benz(a)anthracene	2	36	1	GP82-2(36;5)
Benzo(a)pyrene	0.2	75	11	GP15-1(0.49;0.5), GP82-2(75;5), GP114-1(1.8;0.5), GP123-1(0.68;0.5), GP172-1(0.69;0.5), GP97-1(2.4;0.5), GP99-1(0.31;0.5), GP96-1(0.27;1), SB13-5(4.3;5), GP172-2(0.6;5), GP173-3(3.5;7.3)
Benzo(b)fluoranthene	2	65	3	GP82-2(65;5), GP114-1(2.8;0.5), GP97-1(4.1;0.5)
Dibenz(a,h)anthracene	0.2	6.8	3	GP82-2(6.8;5), GP172-1(0.79;0.5), GP173-3(0.23;7.3)
Indeno(1,2,3-c,d)pyrene	2	30	1	GP-82-2(30;5), GP173-3(2.6;7.3)
Arsenic	6	54	13	GP59-3(6.8;14), GP88-3(15;12), TP-17(54;0.5), GP113-1(11;0.5), GP113-4(16;0.5), GP117-1(9.5;0.5), GP117-4(7.2;0.5), GP126-1(9.9;0.5), GP99-1(6.5;0.5), GP110-2(8.7;5), GP111-1(7.7;0.5), GP112-1(11;0.5), GP123-1(12;0.5)
Lead	750	4260	2	TP1-D(4260;0.5), TP1-D(1550;4)
Aroclor 1260	1	4.3	2	GP73-2(4.3;5), GP79-1(2.1;0.5)
mg/kg = milligram per kilogram Refer to Figure 5 for sample locations. ^a Values listed are strictly detected concentrations. ^b One-half the MRL used for nondetects.				

Table 7
Soil Volumes Exceeding Hot Spot Concentrations
Triangle Park LLC
Portland, Oregon

COC	Hot Spot Concentration (mg/kg)	Maximum detection ^a (mg/kg)	Number of Hot Spot Exceedances ^a	Hot Spot Exceedance Locations ^a (value;depth)
Benz(a)anthracene	200	36	0	
Benzo(a)pyrene	20	75	1	GP82-2(75;5)
Benzo(b)fluoranthene	200	65	0	
Dibenz(a,h)anthracene	20	6.8	0	
Indeno(1,2,3-c,d)pyrene	200	30	0	
Arsenic	200	54	0	
Lead	7500	4260	0	
Aroclor 1260	100	4.3	0	
mg/kg = milligram per kilogram Refer to Figure 4 for sample locations. ^a Values listed are strictly detected concentrations. ^b One-half the MRL used for nondetects.				